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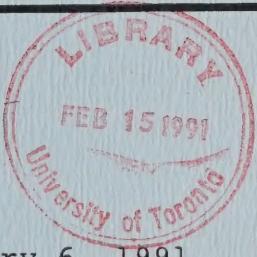
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# ENVIRONMENTAL ASSESSMENT BOARD

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VOLUME: 288



DATE: Wednesday, February 6, 1991

BEFORE:

A. KOVEN Chairman

E. MARTEL Member

FOR HEARING UPDATES CALL (COLLECT CALLS ACCEPTED) (416)963-1249

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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL  
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR  
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental  
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental  
Assessment for Timber Management on Crown  
Lands in Ontario;

- and -

IN THE MATTER of a Notice by the  
Honourable Jim Bradley, Minister of the  
Environment, requiring the Environmental  
Assessment Board to hold a hearing with  
respect to a Class Environmental  
Assessment (No. NR-AA-30) of an  
undertaking by the Ministry of Natural  
Resources for the activity of timber  
management in Crown Lands in Ontario.

-----  
Hearing held at the offices of the Ontario  
Highway Transport Board, Britannica Building,  
151 Bloor Street West, 10th Floor, Toronto,  
Ontario, on Wednesday, February 6th, 1991,  
commencing at 9:20 a.m.

-----  
VOLUME 288

BEFORE:

MRS. ANNE KOVEN  
MR. ELIE MARTEL

Chairman  
Member



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I N D E X   O F   P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
<u>ROBERT MULLER,</u>	51418
<u>PETER MORRISON, Resumed</u>	51418
Continued Direct Examination by Ms. Swenarchuk	51418
Cross-Examination by Mr. Hanna	51520



I N D E X   O F   E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
1705	Possible Employment Implications of FFT terms and conditions.	51423



1           ---Upon commencing at 9:20 a.m.

2           MADAM CHAIR: Good morning. Be seated.

3           MS. SWENARCHUK: Good morning, Madam  
4           Chair, Mr. Martel. Before Dr. Muller proceeds through  
5           the illustrative cost benefit analysis, we have some  
6           questions and material to reply to the discussion that  
7           began last evening.

8           ROBERT MULLER;  
9           PETER MORRISON; Resumed

10          CONTINUED DIRECT EXAMINATION BY MS. SWENARCHUK:

11          Q. And Dr. Muller, my first question is,  
12          were you instructed by Forests For Tomorrow with regard  
13          to preparing your cost benefit analysis to manipulate  
14          or minimize any of the factors in that analysis in  
15          order to achieve a preordained result?

16          DR. MULLER: A. Absolutely not.

17          Q. And specifically were you instructed  
18          by Forests For Tomorrow to minimize the wood costs used  
19          in the analysis?

20          A. Absolutely not.

21          Q. And did you, in conducting the cost  
22          benefit analysis and in arriving at the valuation of  
23          wood to be utilized, digress from conventional  
24          mainstream economic thought with regard to how a cost  
25          benefit analysis is conducted?

1                   A. To the best of my ability I adopted  
2 the standard prescriptions for cost benefit analysis.

3                   MS. SWENARCHUK: And I just bring to the  
4 Board's attention that Dr. Muller conducted and will  
5 present evidence later this morning. He conducted  
6 sensitivity tests with regard to the cost benefit  
7 analysis with the wood price doubled and he has a  
8 certain amount of data also on the effects with the  
9 wood price tripled and I will leave him to testify to  
10 that later this morning.

11                  Q. And further, Dr. Muller, do you think  
12 that the implementation of Forests For Tomorrow's  
13 proposals will result in shutting down single industry  
14 northern towns?

15                  DR. MULLER: A. Ms. Swenarchuk, I have  
16 given that matter considerable thought over the past  
17 evening and morning. I really do not believe that the  
18 Forests For Tomorrow proposals, as I understand them,  
19 will have the effect of shutting down single industry  
20 towns in northern Ontario and I do have some reasons  
21 for that. Would you like me to expand on that?

22                  Q. Please do.

23                  A. I think that the most critical  
24 factors driving the effect on employment in single  
25 industry towns will be the change in costs, the change

1       in wood costs implied by Forests For Tomorrow's  
2       proposals, and the change if any in the constraints  
3       that we place on how much wood can be cut in each year.

4               Now, in the case of increased costs, it  
5       is my opinion, based on the evidence that I have read  
6       and my illustrative cost study, that the percentage  
7       increase in the cost of forestry products like  
8       newsprint will be imposed, that the percentage increase  
9       in costs which will be created by implementing Forests  
10      For Tomorrow's proposals will be quite a small  
11      percentage.

12               In my illustrative case study, it works  
13       out that if we increase the cost of secondary and  
14       tertiary roads by over 50 per cent to allow for various  
15       factors associated with the modified cut, we increase  
16       the cost of wood, the costs of cutting wood by about  
17       \$1.60, \$1.70 per cubic metre.

18               If for very, very crude purposes you say  
19       you need five cubic metres of wood fibre to produce a  
20       ton of product such as newsprint, that would mean the  
21       increase in costs per ton of newsprint would be of the  
22       order of \$8 per ton. If you say very, very crudely  
23       that newsprint is selling for \$500 per ton, then you  
24       are talking about an increase of approximately 1.6 per  
25       cent.

1                   Now, I have no faith in that as a precise  
2                   number, but what I do have faith in is that the  
3                   percentage increase in the costs of forestry product  
4                   production associated with the proposals is very small  
5                   and is likely to be swamped by factors such as changes  
6                   in the exchange rate.

7                   The second critical factor in determining  
8                   the effect of Forests For Tomorrow's proposals, I  
9                   believe, is whether or not they represent a restriction  
10                   on the amount of wood that will be harvested every  
11                   year.

12                   Now, as I understand it, the Board has  
13                   received evidence that in many cases, the amount of  
14                   wood actually being harvested in Ontario is less than  
15                   the so-called MAD, maximum allowable depletion,  
16                   considerably less in a number of cases, and I suggest  
17                   to the Board that the reason for this is that the  
18                   amount of wood that is being taken is driven by market  
19                   forces rather than being constrained by the maximum  
20                   allowable depletion.

21                   Now, as I understand it also, one effect  
22                   of Forests For Tomorrow's terms and conditions might be  
23                   to restrict the permitted harvest of wood in any  
24                   particular year. Effectively that means reducing what  
25                   are now the MADs.

1                    Since the MADs are not binding  
2                    constraints right now in many cases, it is quite  
3                    possible that you could impose the kinds of terms and  
4                    conditions that Forests For Tomorrow are suggesting  
5                    without seriously affecting the total quantity of wood  
6                    being harvested.

7                    Now, I provide you with this opinion in  
8                    my capacity as an economist thinking of informing you  
9                    about the things that I think would be relevant in  
10                   making the decision about whether or not these  
11                   proposals would have serious impacts in small industry  
12                   towns and to the best of my ability, my judgment is  
13                   that there would not be dramatic impact.

14                   Q. And Dr. Morrison, do you have  
15                   comments to add on these subjects?

16                   DR. MORRISON: A. I do. I am prepared to  
17                   set up overheads which I gather will be made available  
18                   to the Board and parties.

19                   MS. SWENARCHUK: Excuse me one moment.  
20                   So the first overhead then entitled Possible Employment  
21                   Implications of FFT Terms and Conditions will, I  
22                   assume, be Exhibit 1705?

23                   MADAM CHAIR: Yes.

24                   DR. MORRISON: Would you like to make a  
25                   package of overheads and exhibits? There is a set.

1 MS. SWENARCHUK: Perhaps that is easiest,  
2 yes.

3 MADAM CHAIR: And how many overheads are  
4 there, Dr. Morrison?

5 DR. MORRISON: There are three.

6 ---EXHIBIT NO. 1705: Package of overheads entitled  
7 Possible Employment Implications of FFT  
Terms and Conditions.

8 MS. SWENARCHUK: Do we have those  
9 overheads?

10 MR. COSMAN: These are not in the witness  
11 statement. We have never seen them.

12 MS. SWENARCHUK: That's right, they are  
13 in response to the Board's questions of yesterday.

14 DR. MORRISON: There are three new  
15 overheads and two overheads which I have drawn from the  
16 set of overheads I used yesterday, Exhibit 1696.

17 The points I would like to make are as  
18 follows: that any employment implications of Forests  
19 For Tomorrow's terms and conditions will depend on the  
20 cost volume distribution of the inventory faced by the  
21 forest industry. Now, I would like to illustrate that  
22 with the next overhead.

23 MR. COSMAN: I am sorry, we do not have  
24 even a hard copy of these. I wonder if he can just  
25 leave it up so we can make a note of it before you go

1 on to the next thing.

2 DR. MORRISON: Sure. A cost-volume  
3 distribution is a process by which you can identify for  
4 each cubic metre in the forest inventory the cost  
5 associated with harvesting it. And then you can  
6 portray that distribution of the volume against the  
7 harvesting cost. And the reason that this is useful,  
8 can I move on to the next one now? The reason that  
9 this is useful is that it allows an identification of  
10 what the potential costs are that may be faced by  
11 industry in conducting harvesting operations.

12 Now, in this overhead, I have two such  
13 cost volume distributions which indicate the amount of  
14 volume available at given harvesting costs for the  
15 entire inventory. And on the assumption that Forests  
16 For Tomorrow's terms and conditions will have an impact  
17 on this distribution, we can identify possible impact  
18 with the shaded areas in here in Figure A and here in  
19 Figure B.

20 In Figure A, the area affected is at the  
21 high end of the cost distribution which would imply  
22 that if Forests For Tomorrow's terms and conditions  
23 have an impact on timber supply available to the  
24 industry, inventory available to the industry, that it  
25 would be occurring at the high end of the cost scale.

5 Now, for a number of reasons, I believe  
6 that at least some of the wood that might be removed  
7 from potential timber production by Forests For  
8 Tomorrow's terms and conditions would be at the high  
9 end of the cost scale and the reasons for that is that  
10 if you are providing, for example, large areas of  
11 undisturbed forest suitable for wildlife habitat of  
12 forest interior species, for example, then you are  
13 going to be dealing with forest that is not close to  
14 mills at present.

15 MR. FREIDIN: Not close to mills, I am  
16 sorry?

17 DR. MORRISON: Not close to mills at  
18 present. You are going to be dealing with forest which  
19 is not accessed at present which means that the costs,  
20 transportation costs and road building costs would be  
21 higher for that portion of the inventory.

1       conditions is at the high end, is that this might be  
2       area where forest operations are difficult to carry  
3       out, areas such as swampy areas, areas where the  
4       terrain is difficult and the harvesting costs  
5       associated with operating in such terrain would be  
6       higher.

7               Now, there are reasons for supposing that  
8       some of the inventory that might be removed as a result  
9       of Forests For Tomorrow's terms and conditions would be  
10       at the low end and that is that if there are forested  
11       areas that are close to urban centres or close to  
12       towns, then those might be preferred recreational  
13       areas.

14               But probably the most important point  
15       from this overhead is that what I have portrayed here  
16       in terms of the cost volume distribution is for the  
17       inventory as a whole and that is an inventory which, if  
18       you assume a rotation age of 100 years, would crudely  
19       support a harvest, 100 harvests and the actual harvest,  
20       the distribution of harvesting costs observed by the  
21       industry, actually the volume removed in a given year  
22       will be a very small fraction of this total  
23       distribution.

24               And what that suggests is that there is  
25       considerable flexibility in terms of the way that the

1       harvest is allocated in space and time to allow for  
2       reductions or removals of land from timber production  
3       without having a significant impact on a harvest.

4                   And that brings me to my next point which  
5       is that any possible employment implications of Forests  
6       For Tomorrow's terms and conditions is unlikely to  
7       depend on changes in supply, the volume for it over the  
8       short-term.

9                   And the first reason for that is that  
10       over the short term, indeed over the next few decades I  
11       would argue, we are talking about making a transition  
12       to a sustainable yield. This is not a process that is  
13       going to happen overnight. And it is a process that,  
14       according to Forests For Tomorrow's terms and  
15       conditions, specifically number 92, is going to be  
16       paying attention to the goals of sustainability of the  
17       forest and the goal of community stability.

18                  Just to illustrate that first point about  
19       the transition to the sustained yield, I am going to  
20       turn to an overhead which I presented yesterday which  
21       displays the set or the harvesting decision about the  
22       cutting schedule and there are three decisions  
23       indicated here. You can make a decision about the rate  
24       of decline of the harvest associated with the  
25       anticipated fall-down, the length of the transition

1 period and the sustained yield level.

2 MR. FREIDIN: Just for the record, the  
3 witness is referring to Exhibit 1696, overhead number  
4 12.

5 DR. MORRISON: Thank you very much.

6 To my knowledge Forests For Tomorrow has  
7 not imposed any terms or conditions which would  
8 determine the rate of decline in the harvest associated  
9 with the fall-down or the length of the transition  
10 period. What that means is that again there is  
11 flexibility, especially over the short term to allow  
12 for alternate paths down to the sustained yield level  
13 or the sustainable level. And that is a flexibility  
14 which can accommodate the goal of community stability.

15 The next point I would like to make is  
16 that over the long term, those communities can make  
17 adjustments and indeed now are making adjustments,  
18 adjustments in the face of timber shortages which are  
19 the result of present practices, adjustments which  
20 reflect the sensitivity of the industry to economic  
21 forces beyond their control, notably the shutdowns of  
22 sawmills in various towns in Ontario, and they are also  
23 making if you like the long-term adjustment which I  
24 indicated yesterday associated with technological  
25 change which is reducing the amount of employment per

1 cubic metre in the forest industry.

2 The next point I would like to make is  
3 that any cost changes are likely to be small. My  
4 colleague, Dr. Muller, has already alluded to that.  
5 But I would also remind the Board of the forest  
6 industry's evidence in Panel 2 where one would expect a  
7 fairly strong case to be made for the consequences of  
8 withdrawing timber from the land base. And in fact, a  
9 relatively small change in delivered wood cost was  
10 observed as a result of imposing what they termed  
11 inflexible guidelines.

12 The second or the next point that I would  
13 like to make is that any cost changes could be offset  
14 by elimination of the "oldest first" harvesting rule  
15 which the Ministry currently employs which is, in my  
16 opinion, an arbitrary rule and without an economic  
17 foundation and increased efficiency of forest  
18 management.

19 Many of the decisions that I have  
20 discussed over the last two days that are made in the  
21 course of timber management and forest management could  
22 be made more efficiently and presumably with the  
23 improved planning associated with that improved  
24 decision making, costs could be reduced for the  
25 industry.

The next point I would like to make is that any effects of cost changes are likely to be undetectable against the background of quite dynamic economic changes in the forest industry's economic circumstances.

And to illustrate that, I will just draw on an overhead I used yesterday which is page 24 of Exhibit 1696 which shows the changes in lumber prices over time and I will note that within very short periods of time, on the order of a few months, you can get changes of 30 per cent, changes in lumber prices.

MR. FREIDIN: I think that is page 24.

DR. MORRISON: Thank you.

The last point I would like to make with respect to any employment implications of Forests For Tomorrow's terms and conditions is that it is necessary to consider the distributional effects of any employment changes and that means distribution not only regionally, but among the various employment groups that might be affected by those changes.

MR. FREIDIN: Can you go back and show what the last point was, please?

DR. MORRISON: Sorry.

MR. FREIDIN: What is the bottom thing?

MS. SWENARCHUK: Distributional effects

1 of any employment changes must be considered marginal  
2 versus discontinuous.

3 MR. FREIDIN: Thank you.

4 DR. MORRISON: And I will be explaining  
5 that last point in the next overhead.

6 These are the groups that are likely to  
7 be affected as a result of Forests For -- that may be  
8 affected as a result of Forests For Tomorrow's terms  
9 and conditions.

10 MR. FREIDIN: I am sorry again. For the  
11 record we are looking at an overhead entitled  
12 Distribution of Possible Employment Effects?

13 DR. MORRISON: That's right, and it is  
14 the last one of the three new ones.

15 Okay, for the first three groups of  
16 employment --

17 MS. SWENARCHUK: Q. That is logging,  
18 sawmilling and pulp and paper?

19 DR. MORRISON: A. Thank you. If there  
20 is a change in the amount that can be harvested or if  
21 there is a change in cost which translates into a  
22 change in the amount harvested, then there may be  
23 employment effects in these groups.

24 But I would like to emphasize that those  
25 employment effects are likely to be small and that they

1 are going to be evenly distributed. They are not going  
2 to be by and large occurring all in one area and will  
3 not be occurring just on one town, all be occurring in  
4 one town at least for the purposes of this discussion.  
5 Which means that the impact or the effect borne by any  
6 given town or any given firm is likely to be relatively  
7 small and is not likely to lead to a major change in  
8 operations.

9                   Where we may see a significant effect as  
10 my colleague, Dr. Muller, alluded to yesterday, is in  
11 the nature of silviculture activity carried out in the  
12 province and there what we would likely be losing, we  
13 would likely be having a significant employment effect  
14 in particular on tree planters operating in the north  
15 on a seasonal basis, many of whom, as my colleague  
16 pointed out yesterday, do have employment opportunities  
17 elsewhere.

18                   The last item is the employment effects  
19 on the Ministry of Natural Resources and based on the  
20 amount of work laid out for them in Forests For  
21 Tomorrow's terms and conditions, I would suggest that  
22 the MNR's staffing level will increase.

23                   MR. FREIDIN: Cost of that?

24                   DR. MORRISON: Infinite.

25                   MR. COSMAN: Sorry, what was the answer

1 to that?

2 DR. MORRISON: Have I costed that, no.

3 MADAM CHAIR: What would better other  
4 industries, Dr. Morrison?

5 DR. MORRISON: Those would be other  
6 industries operating in the forest that may increase,  
7 that may have an increase in employment, possibly a  
8 decrease depending on how they are impacted by timber  
9 management activities and depending on how they respond  
10 to some of the other Forests For Tomorrow's terms and  
11 conditions and I hesitate to draw a conclusion about  
12 what direction that might go.

13 Based on some of the concerns as I  
14 understand it associated with hunting and fishing and  
15 some of the concerns associated with tourism, I would  
16 suggest that that might increase; that I would be hard  
17 pressed to put a number on that.

18 Now, it may be that if there is a  
19 reduction in the amount harvested, that differs from  
20 the reduction that we anticipate given the Ministry's  
21 current program, or it may be that if costs increase by  
22 some amount, that some industries will shut down  
23 operations. But that is a possibility that has to be  
24 faced.

25 I would like to make two points about

1 that. One is that what we are suggesting if we  
2 attribute that shutdown or that closure to Forests For  
3 Tomorrow's terms and conditions and associated  
4 restrictions is that we are suggesting that it is the  
5 last straw that is breaking the camel's back that was  
6 responsible for the breakage and not the six bales of  
7 hay that were already placed on the camel's back.

8 We would like to remind the Board, for  
9 example, there are closures currently being faced in  
10 the forestry, that a number of reports have pointed to  
11 the difficulty that the sawmilling industry finds  
12 itself in at present, especially after the imposition  
13 of the 15 per cent softwood export tax, and I would  
14 suggest that it is not appropriate to assign  
15 responsibility for any closures which might result as a  
16 result of imposing Forests For Tomorrow's terms and  
17 conditions simply to those terms and conditions.

18 In some cases the industry in some small  
19 communities are accidents waiting to happen.

20 Even if there are industries which close  
21 down at the same time as Forests For Tomorrow's terms  
22 and conditions are imposed, if they are, or shut down  
23 at the same time as those are being phased in as many  
24 of them -- as I believe Forests For Tomorrow suggests  
25 many of them will be, there is the question of

1 addressing what sort of an impact that might have on  
2 those communities in which those industries operate.  
3 And what kind of employment opportunities exist for  
4 people who are employed in those industries.

5 And to get an idea of what that potential  
6 impact might be, I drew on the Ministry of Natural  
7 Resources evidence from Panel 5 and the industry's  
8 evidence for Panel 2 to identify the towns in which the  
9 major plants, forestry industry plants occurred in  
10 Ontario and specifically to identify whether they  
11 occurred in what the Canadian Forestry Service  
12 identifies as forest sector dependent communities.

13 For the sawmills, only 8 of the 40 major  
14 sawmill operations identified in MNR's Panel 5 evidence  
15 occurred in what has been identified as forest sector  
16 dependent communities, that represents 20 per cent.

17 Similarly for particle board, it was 20  
18 per cent, veneer and plywood, 21 per cent, for  
19 waferboard, 25 per cent, and for paper and allied  
20 industries, 8 of 33 for 24 per cent.

21 Q. So what this means is that in terms  
22 of the possible distributional effects of possible  
23 changes in employment that may result from possible  
24 changes in wood supply or wood cost, if in fact we get  
25 an industry shutdown, it is going to be a relatively

1 small proportion of those industries which are going to  
2 lead to a major hardship for the people who are  
3 operating in those industries in terms of the ability  
4 to find alternative work within their community.

5 So to conclude then, it is possible that  
6 there will be some negative employment implications of  
7 Forests For Tomorrow's terms and conditions. They are  
8 unlikely to be important over the short term because of  
9 the flexibility that I have alluded to and because of  
10 the commitment on the part of Forests For Tomorrow to  
11 sustainability and community stability, and over the  
12 long term, adjustments can be fairly readily made. And  
13 by over the long term, I am talking 40 or 50 years.

14 Thank you, Madam Chairman and Mr. Martel.

15 MADAM CHAIR: Thank you, Dr. Morrison.

16 MS. SWENARCHUK: Q. I just have one more  
17 area of questioning before we proceed to cost benefit  
18 analysis and this is to refer again to material  
19 presented to the Board by Mr. Benson in part 2 of his  
20 witness statement, page 334 and this was in his chapter  
21 on the Temagami Crown Unit and I want to put a  
22 statement from that chapter to Dr. Muller and Dr.  
23 Morrison.

24 And it is with regard to a quotation from  
25 the presentation of the Temagami Forest Products

1       Association to the Standing Committee on Resources  
2       Development. The important part of their presentation  
3       disclaiming the concept of applying sustainable yield  
4       to the forest of Temagami was as follows:

5                    "To suddenly reduce the volumes by  
6                    half as indicated for sustainable or  
7                    normal yield would also reduce the  
8                    existing mills by half. Which ones will  
9                    close, who will decide this drastic fate  
10                   of a community? But with the existing  
11                   MNR's method there is time for the pine  
12                   mills to adjust or close down by their  
13                   own decision. This is happening right  
14                   now."

15                   I would like both of you to comment on  
16                   the process demonstrated in this quotation relevant to  
17                   the comments you have made regarding employment  
18                   implications of Forests For Tomorrow's position; Dr.  
19                   Muller?

20                   DR. MULLER: A. Well, I think this  
21                   quotation which you have just read dramatically  
22                   indicates that under current practice, the allowable  
23                   cut in certain areas is declining and consequently, the  
24                   volume of wood being taken in certain areas of the  
25                   province is declining and mills are shutting down.

1                   And I think that this is consistent with  
2 what people have referred to as the fall-down effect,  
3 the fact that the total volume of timber being  
4 harvested yearly now is higher than it will have to be  
5 under sustained unit management and consequently under  
6 current practices, there has to be a continuing decline  
7 in the volume of wood being taken.

8                   Now, I think this is particularly  
9 important to recognize when you ask what are the  
10 effects of the terms and conditions proposed by any  
11 party and in particular the terms and conditions  
12 proposed by Forests For Tomorrow. Because it is only  
13 fair to consider what I would call the differential  
14 impact. We are going to have reductions in employment  
15 because of this fall-down which is predicted by the  
16 Ministry of Natural Resources anyway and by Professor  
17 Benson under current practice.

18                   The only thing that is fair to look at is  
19 how much extra reduction in employment might there be  
20 by imposing the terms and conditions advocated by a  
21 particular party, in particular Forests For Tomorrow.  
22 And I would remind you of the crude sketch that we drew  
23 last time, I believe it was Exhibit 1703, which  
24 indicated that my interpretation of the debate is that  
25 Forests For Tomorrow would like to see a small

1 reduction perhaps in the allowable cut now which would  
2 allow a somewhat increased allowable cut in the future  
3 during the period which the Ministry of Natural  
4 Resources envisages a substantial dip.

5 Now, the point I am trying to emphasize  
6 is that it is only the difference between the two  
7 proposals that we should be examining when we talk  
8 about employment effect.

9 Q. Dr. Morrison, did you want to add to  
10 his comments?

11 DR. MORRISON: A. No.

12 Q. That is fine, thank you.

13 In that case, Dr. Muller, would you  
14 please proceed with your testimony with regard to the  
15 illustrative cost benefit analysis?

16 MR. MARTEL: Just before we go on then,  
17 because yesterday I raised a matter, I do not know if  
18 you had an opportunity to look at it overnight after my  
19 colleague raised -- the matter I think has been  
20 answered, but we are still looking at - and maybe there  
21 are no answers in terms of quantifying what all the  
22 other things one must review in determining what type  
23 of decision one makes - and that I think you indicated  
24 you had looked. Were you able to find anything last  
25 night?

1 DR. MULLER: Can you just rephrase for me  
2 the specific question you are referring to me?

3 MR. MARTEL: It is hard for me to  
4 rephrase my question, it went on for an hour or  
5 something like that.

6 But I was concerned about not being able  
7 to get a handle on the other factors, economic factors  
8 one has to take into consideration when making  
9 decisions. We had started to - I think it was after  
10 Mrs. Koven raised her question, I indicated the  
11 difficulty I was having at least was trying to get a  
12 sense of the values that we place on the other  
13 non-timber resources and how one ties that in to the  
14 decision making if you cannot quantify them in any way  
15 at all, you cannot put any value on them at all, how  
16 does one take that into consideration and we have not  
17 received much, I do not believe, at least not from my  
18 satisfaction, during the entire hearing on that area.

19 MS. SWENARCHUK: Q. I think Dr. Morrison  
20 has some comments to make on that subject.

21 DR. MORRISON: A. In fact, in response  
22 to your question, I prepared two overheads which you  
23 will I guess also have to distribute as exhibits.

24 MR. FREIDIN: I am sorry, Madam Chair,  
25 was the last set of exhibits given an exhibit number?

1                   MADAM CHAIR: Yes, sir.

2                   MS. SWENARCHUK: Just include these with  
3                   1705.

4                   MADAM CHAIR: This will be part of 1705?

5                   MS. SWENARCHUK: Yes.

6                   MADAM CHAIR: And so there are seven  
7                   overheads all together in 1705?

8                   MS. SWENARCHUK: Right.

9                   MR. FREIDIN: We are now looking at the  
10                  overhead which is entitled Valuation of Non-Market  
11                  Benefits and Costs.

12                  MS. SWENARCHUK: Madam Chair, I think  
13                  there will be five all together. We did not intend to  
14                  recopy again the two pages from the previous exhibit.

15                  MADAM CHAIR: Okay, five overheads.

16                  DR. MORRISON: The basic idea behind the  
17                  valuation of non-marketed benefits and costs is that we  
18                  are trying to assess the willingness to pay. And the  
19                  willingness to pay can be assessed through markets and  
20                  it can be assessed through a number of other means.

21                  Willingness to pay can be assessed  
22                  through the markets. The example that came to mind is  
23                  for me is that my landlord is trying to sell his house.  
24                  What he is doing is he is advertising, getting people  
25                  to come and look at the house, make some guess about

1 how much they think it is worth and is hopefully from  
2 his point of view going to sell the house.

3                   What he is doing essentially is  
4 conducting a survey of the buyers, the potential buyers  
5 for his property. He is advertising, he is letting  
6 them know what he thinks it is worth and getting their  
7 responses or discussing it in any cases or his agent is  
8 discussing and there is a negotiation process which  
9 goes on in the process of that.

10                  The process for valuing non-market  
11 benefits and cost is not very different. There is less  
12 guidance based on examination of other causes that  
13 might be being sold that might be similar as to exactly  
14 how much he ought to be suggesting it be sold for. But  
15 even if you knew roughly where it was and roughly the  
16 size of the house, you could make a reasonable guess,  
17 an order of magnitude guess as to what he might be  
18 suggesting as its price.

19                  For valuation of non-marketed benefits  
20 and costs -- there is one other point I wanted to make.  
21 That valuation of non-market benefits and costs is  
22 important in other areas and I will choose an example  
23 that I understand is close to your heart which is the  
24 concern for small industry towns.

25                  If an industry is faced with a relocation

1 or an industry is faced with a closure and the people  
2 in the town are faced with relocation, then they are  
3 going to be bearing costs and some of those costs can  
4 be marketed as in transportation costs to their new  
5 location, but others, other values that they hold,  
6 other important things in that community for them,  
7 their friendships, the familiarity that they have with  
8 their environment, the sense of community spirit which  
9 may exist, access to recreational opportunities in the  
10 immediate vicinity of the town, all of those are  
11 non-marketed benefits, but if we were to compensate  
12 them for having to leave that town, we ought to be  
13 trying to place a value on that.

14 It is exactly an analogous process trying  
15 to place a value on other kinds of non-marketed  
16 benefits and other non-marketed costs. And what I will  
17 do is briefly go through some of the techniques which  
18 Eric Hyman in his article in 1981 which is part of our  
19 source book identifies as ways of trying to do that.  
20 There are a number of tools which exist, and which have  
21 been well developed.

22 The article is now ten years old and he  
23 is summarizing research that had occurred up to that  
24 point. The research has blossomed since then. There  
25 are a number of ways in which you can evaluate the

1       willingness to pay. You can use economic surrogates,  
2       economic measures which give you an indication of how  
3       much non-market benefits and costs might be by  
4       considering related expenditures. How much are people  
5       willing to pay for things related to, for example, a  
6       particular recreational opportunity.

7               You can also use an approach called the  
8       travel cost approach which has been used for such  
9       things as evaluating the value that people place on  
10      parks or specific locations and what you do is you try  
11      and identify how much they have been willing to pay to  
12      come to that spot.

13              You can obtain values for the unit day  
14       that a particular recreational opportunity or  
15       particular benefit is received. You can examine, as  
16       might be relevant in some of the resource-dependent  
17       communities, you can evaluate the changes in property  
18       values. This is also an approach which has been used  
19       in many cases throughout North America and other parts  
20       of the world to evaluate such things as the impacts of  
21       establishing particular undesirable facilities near  
22       people's houses such as dumps and landfills, waste  
23       disposal sites.

24              You can also examine the wage  
25       differentials, the differences in wages which obtain

1       between different areas within a province or within a  
2       country to assess the amount that people need to  
3       receive to be compensated for living in undesirable  
4       circumstances.

5                   You can also adopt what are known as  
6       supply-side approaches which include an attempt to  
7       estimate the cost of replacing a particular feature of  
8       the environment or a particular non-marketed benefit  
9       and you can also evaluate what kinds of mitigative  
10      expenses might be associated with trying to prevent a  
11      particular outcome.

12                  And again an example of that might be  
13       considering how much it would cost to prevent say a  
14       decline or a drop in a particular endangered species  
15       population.

16                  You can consider the costs associated  
17       with alternatives, alternative ways of providing the  
18       same benefit and use that as an estimate.

19                  The third major approach is what has been  
20       called hypothetical valuation and it has more recently  
21       been labeled with the term "contingent valuation" which  
22       as we have already described involves a process of a  
23       formal structured process of trying to identify how  
24       much people would be willing to pay for a particular  
25       benefit and that has been applied successfully and has

1       been used in environmental impact assessment again  
2       throughout the world.

3               You can evaluate the kinds of trade-offs  
4       that people are willing to make among different  
5       benefits or among different costs as a way of trying to  
6       get a handle on how much they might be willing to pay.  
7       This would mean that you would not necessarily be  
8       operating in dollars terms but you could operate in  
9       some other currency.

10              Valuation of human lives is relevant in  
11       some circumstances. I guess I would suggest that is  
12       less relevant for timber management at least insofar as  
13       valuing loss of limbs, valuing death or in valuing loss  
14       of eyes. Again which is commonly done by insurance  
15       companies and through the court system.

16              The last point or the last way in which  
17       you can value non-marketed benefits and costs is to ask  
18       the question that my colleague alluded to in his  
19       example earlier, where you could identify whether  
20       people would be willing to pay more than a certain  
21       amount to obtain a benefit and then if not, perhaps the  
22       project ought not to go ahead. But it does not require  
23       you to assign -- to specifically evaluate a benefit but  
24       only in comparison to a proposed alternative.

25              MADAM CHAIR: Excuse me, Dr. Morrison, is

1 it your evidence that with respect to everything that  
2 could be done in evaluating willingness to pay, what  
3 has been done in Ontario is the two studies you  
4 referred us to yesterday. Those are the two studies  
5 that you know of that have been done in Ontario?

6 DR. MORRISON: Well, in fact, the  
7 Importance of Wildlife to Canadians is a national  
8 study.

9 MADAM CHAIR: Yes.

10 DR. MORRISON: Those are the only two  
11 ones I am aware of.

22 And I would like to perhaps direct your  
23 attention to the witness statement number 10 when Mr.  
24 Zane Smith from the U.S. Forest Service is going to be  
25 talking about integrated resource.

1 MS. SWENARCHUK: Q. You're smiling, Dr.  
2 Morrison, because you anticipate each one of my  
3 questions.

4 DR. MORRISON: A. I hope so.

5 MR. COSMAN: I am sorry, I missed that  
6 last.

7 DR. MORRISON: I understand that Mr. Zane  
8 Smith from the U.S. Forest Service or formerly of the  
9 U.S. Forest Service is going to be addressing the issue  
10 of integrated resource management which would include  
11 his consideration of non-timber management forestry.

12 MR. FREIDIN: Could you put that slide  
13 back up, the last slide.

14 DR. MORRISON: Sure.

15 MR. FREIDIN: Ms. Swenarchuk, will Mr.  
16 Smith be speaking to the issue as to whether in fact  
17 the valuation of non-timber benefits has in fact been  
18 nailed to the wall and it is staying there?

19 MS. SWENARCHUK: I put a similar type of  
20 question to them and I'm sure that if we don't, I am  
21 sure you will, Mr. Freidin.

22 MR. FREIDIN: Will I be faced with the  
23 situation where I should ask all the questions in terms  
24 of evaluating, not to ask this panel?

25 MS. SWENARCHUK: No, we do not take that

1 kind of position, Mr. Freidin.

2 MR. FREIDIN: Okay.

3 MS. SWENARCHUK: Q. Thank you very much,  
4 Dr. Morrison.

5 One comment, Madam Chair. I believe it  
6 is now evident that we will be taking longer to  
7 complete the direct examination than we estimated at  
8 the beginning and probably going into this afternoon.

9 Would you like to take a break now before  
10 he begins his whole new subject area or proceed for the  
11 next 15 minutes?

12 MADAM CHAIR: Why don't we take our break  
13 now; be back in 20 minutes.

14 ---Recess at 10:20 a.m.

15 ---On resuming at 10:45 a.m.

16 MADAM CHAIR: Please be seated.

17 MS. SWENARCHUK: Sorry to return to a  
18 tiresome topic, Madam Chair, but I suppose I must be a  
19 little more serious with Mr. Freidin and say that if he  
20 has questions with regard to the American literature  
21 which need a response from an economist, they should be  
22 put to this panel.

23 If he has questions with regard to the  
24 utility of those American studies and non-timber values  
25 as they are used in the American planning process,

1       those would be appropriate questions for Mr. Smith, but  
2       Mr. Smith is not an economist.

3                    MR. FREIDIN: Thank you.

4                    DR. MULLER: Madam Chair, I would like to  
5       turn to Chapter 5 of our witness statement which starts  
6       on page 119 and review with you the sample cost benefit  
7       analysis which we have prepared. In addition, I am  
8       going to be introducing the material by referring you  
9       to the Treasury Board benefit cost guidelines which  
10      appear in our source book and perhaps you might wish to  
11      turn to the benefit cost guide at this point.

12                   MADAM CHAIR: That is book number 2, Dr.  
13      Muller?

14                   DR. MORRISON: Source book number 1 about  
15      a quarter of the way through.

16                   MADAM CHAIR: Thank you.

17                   MS. SWENARCHUK: Q. What is it called,  
18      Dr. Morrison?

19                   DR. MORRISON: A. Well, it is probably  
20      under Canada in terms of the --

21                   Q. Yes.

22                   DR. MULLER: A. Canada Treasury Board.

23                   MADAM CHAIR: 1976?

24                   DR. MULLER: 1976. I will be referring  
25      to that in a moment.

1 First of all I would like very briefly to  
2 make some introductory comments which are highlighted  
3 in our witness statement. On page 120 of the witness  
4 statement, we make the comment that cost benefit  
5 analysis is primarily a method of organizing  
6 information about an undertaking so as to guide the  
7 selection of the best alternative. And I think it is  
8 important to understand what cost benefit analysis and  
9 what it is not.

Cost benefit analysis is particularly useful, I believe, in helping you organize information in order to make a choice. On page 121, item 5.1.1, we point out that the steps in undertaking a cost benefit analysis include defining the project that you are undertaking, specifying the alternatives that you are going to consider, predicting the impacts on the outputs of each alternative and the inputs of each alternative, and putting a value on these impacts. And I hope that Mr. Freidin will permit me to point out that these are essentially the same stems as are required in the Environmental Assessment Act.

22 On page 123, item 5.1.3, we make the  
23 comment that, at least in my personal opinion, there is  
24 no one correct way to conduct a cost benefit analysis.  
25 A cost benefit analysis is a way of approaching a

1 decision and you can do it in a very simple,  
2 straightforward back-of-the-envelope manner or you can  
3 do it in a very simple complicated or sophisticated  
4 manner.

5 On page 125, at the top of the page, we  
6 make the comment that the informational costs of a  
7 sophisticated cost benefit analysis may be very high.  
8 By informational costs, I simply mean the costs of  
9 acquiring all of the information that you need to  
10 conduct a detailed cost benefit analysis and the  
11 information is expensive to acquire and difficult to  
12 get and sometimes not very reliable, and once you try  
13 to take it all into account, you sometimes get models  
14 of very great complexity. And sometimes people have  
15 difficulty in interpreting the results of these models.

16 So that sometimes I think it is possible  
17 to do too complicated study. But in the second  
18 paragraph of that page, we make the comment that the  
19 discipline involved in setting up the simplest of cost  
20 benefit analyses is remarkably effective in focusing  
21 attention on the key issues of project selection.

22 Certainly that was my experience when I  
23 was trying to prepare the sample cost benefit analysis.  
24 It lead me, I believe, to a much greater feel for the  
25 importance of the various factors that we would have to

1 consider.

2 Now, Madam Chair, I would like to draw  
3 your attention to the benefit cost guide prepared by  
4 the Treasury Board. It is dated March 1976.

5 Madam Chair and Mr. Martel, I believe  
6 that this guide provides an excellent introduction to  
7 cost benefit analysis. Although it is now over 14  
8 years old, it is still in print and still being sold.  
9 I notice that the Treasury Board has roughly increased  
10 the price by a factor of 10. It sells for \$15.

11 The information from this benefit cost  
12 guideline or guide, I believe, is readily accessible to  
13 your average public servant. I assume that your  
14 average public servant is an intelligent person who is  
15 hard working but has not got a Ph.D. in economics. So  
16 the level of this discussion, I believe, is entirely  
17 accessible to our public servants who I believe are, as  
18 I say, very hard working, intelligent people.

19 I think it might be helpful if I just  
20 drew your attention to about six sections of this  
21 document. First of all, I would like to draw your  
22 attention to Chapter 1 which is labeled "Introduction".  
23 It starts on page 3 of the document. And I would  
24 simply comment that I find this a very balanced  
25 introduction to the topic of cost benefit analysis and

1 it does not claim too much for cost benefit analysis,  
2 that is it does not claim that it can solve all the  
3 problems of the world. In particular, pages 4 and 5  
4 mention some of the limitations of cost benefit  
5 analysis, the uses and limitations of cost benefit  
6 analysis.

7 I would now draw the Board's attention to  
8 Chapter 2. Chapter 2 of this benefit cost guide  
9 reviews what they call the conceptual basis of benefit  
10 cost analysis. Parenthetically I will remark that I  
11 first learned about this subject under the title of  
12 cost benefit analysis and other people have first  
13 learned of it under the title of benefit cost analysis  
14 and I interpret the terms to be synonymous.

15 I draw your attention to the last  
16 paragraph on page 8 and the last paragraph stresses  
17 that the objective of benefit cost analysis is to  
18 measure what total production and consumption  
19 opportunities would be with and without these public  
20 expenditures. That is the content of the first  
21 sentence of the last paragraph.

22 MR. MARTEL: Would we do anything in  
23 Canada then?

24 DR. MULLER: Pardon?

25 MR. MARTEL: Would we do anything in

1       Canada then? (Laughter)

2                   DR. MULLER: Do you mean -- if this is a  
3       serious question, Mr. Martel, the question is whether  
4       or not any activities in Canada contribute to  
5       production and consumption. I think that I am enough  
6       of a Canadian nationalist to believe that there is lots  
7       of good consumption and production activities going on  
8       in Canada.

9                   What I wanted to draw your attention to,  
10       Madam Chair and Mr. Martel, is that this objective as  
11       stated on page 8 is phrased in terms of economic  
12       efficiency but basically it is what I referred to in my  
13       introductory comments as making sure that the economic  
14       pie is as big as possible.

15                  So I would draw your attention to the  
16       comments on pages 19 to 24. Page 19, at page 19 begins  
17       a section called "Shadow Pricing of Unemployed  
18       Resources". And these pages, pages 19 to 24, relate to  
19       the shadow pricing of unemployed resources and the use  
20       of multipliers. Now, the shadow pricing of unemployed  
21       resources refers to the practice which I discussed in  
22       my examples last, and I guess it was Monday, when I  
23       suggested that when labour was being paid \$10 an hour  
24       in one occupation and could only find alternative  
25       occupations paying \$5 an hour. I said that doing a

1 social cost benefit analysis would put a price on the  
2 labour of \$5 an hour. That is called shadow pricing.  
3 So the comments in this section are relevant to my  
4 discussion of dealing with unemployment issues.

5 These pages, Madam Chair and Mr. Martel,  
6 warn against uncritically assuming that resources are  
7 unimportant and they warn against the use of secondary  
8 benefits and multipliers and we have been through this  
9 discussion before, I just would like to draw your  
10 attention to this discussion but you may wish to  
11 consult and you may wish at a later date to ask me  
12 about.

13 I would like you to note the statement on  
14 page 31. The second paragraph of page 31, this  
15 paragraph states:

16 "That the fundamental criterion for  
17 investment in circumstances of choice is  
18 unambiguous. The investments should be  
19 chosen which maximize net present value."

20 And I interpret this to be the same  
21 concept as the maximization of the net present value of  
22 social benefits which is the criterion which we have  
23 been advocating in our discussion.

24 I would like to draw your attention to  
25 the discussion of non-efficiency effects following page

1       32. At the bottom of the page 32 it says:

2                    "The federal government may have goals  
3                    in undertaking public projects other than  
4                    that of improving the efficiency of the  
5                    economy."

6                    And moving onwards to page 39, there is a  
7                    discussion on about how to deal with questions  
8                    associated with the distribution of income, questions  
9                    which I referred to in my introductory comments as  
10                   determining what is the size of the slice of the pie  
11                   that each person gets.

12                   There are very useful comments in these  
13                   sections. They lead to a recommendation on pages 43,  
14                   on page 43, that separate presentation of the  
15                   distributional effects of a project should be presented  
16                   separately.

17                   Now, I must confess to the Board that in  
18                   drawing up our sample cost benefit analysis, I did not  
19                   prepare a table showing the distribution of costs and  
20                   benefits. I plead only lack of time.

21                   Finally, I would draw your attention to  
22                   the appendix on pages 75 and 76. This appendix refers  
23                   to an inventory of common errors in benefit cost  
24                   studies. Particularly relevant are errors such as the  
25                   second one, counting appreciated value of land relative

1 to the general price level as a benefit.

2 This has to do with questions of property  
3 values. And I will content myself simply by suggesting  
4 that losses in property values such as the loss in the  
5 value of a house need to be interpreted very carefully  
6 in the context of benefit cost analysis.

7 Basically the problem is to avoid double  
8 counting, that is, you can count the loss in wages that  
9 a person is expected to obtain in a particular  
10 community or you can count the value of his house so to  
11 speak. The point is that the value of his house in  
12 some sense represents the capitalized value of all the  
13 benefits he expects to get from living in his house  
14 while he resides in the community.

15 So if the benefits from residing in the  
16 community fall, for example, if employment  
17 opportunities fall, then you can say that a person has  
18 suffered an annual loss as measured by his reduction in  
19 income or you can say that he has taken a capital loss  
20 which might be measured by the loss in his property  
21 values but you shouldn't do both at the same time.

22 MR. MARTEL: But could I ask a question.

23 DR. MULLER: Yes.

24 MR. MARTEL: Has he not lost both? I  
25 mean, you lose your job and you have no income and you

1 are forced to relocate and you cannot sell your house.  
2 How is that a double entry?

3 DR. MULLER: Well, I believe that what  
4 you should be looking at is the issue of -- he moves to  
5 a different community, he has lost some income there  
6 but he has also lost the benefits of living in the  
7 community that he was in to begin with. And they can  
8 be, in some sense, measured by what people are willing  
9 to pay to achieve them.

10 One way of getting those benefits is to  
11 buy a house in the community so that the value of the  
12 house measures the capitalized future value of the  
13 benefits you see from living in the community. You do  
14 not like that?

15 MR. MARTEL: Well, let us take an example  
16 of a miner who loses his house on three different  
17 occasions because he worked in three different mines  
18 and all three mines closed underneath him in a ten-year  
19 period. This is factual. He not only had to relocate  
20 halfway across Canada, he lost his job and he lost his  
21 house in both communities, in three different  
22 communities, his investment in his house each time was  
23 lost and his job was lost.

24 Now, I mean, one can argue, I guess, some  
25 economics jargon, but to the guy who has lost the job

1 and who has lost the house three times, I do not care  
2 what kind of figures or jargon you put around it, he  
3 has taken a hell of a beating.

4 DR. MULLER: That is absolutely true.

5 Mr. Martel, I do not want to minimize the importance of  
6 the examples that you draw.

7 I will draw your attention to item 76,  
8 the item at the bottom of page 76 which refers to  
9 including transfer payments in benefits or costs. Now,  
10 dealing with property values really is tricky but when  
11 a guy takes a beating on a house so to speak, he loses  
12 money, but the guy who buys the house gets money in the  
13 sense that he gets a house which is providing certain  
14 services and he gets it at a bargain. So in some sense  
15 what is happening is that --

16 MR. MARTEL: Sounds like a piranha.

17 DR. MULLER: Well, you know, it is a  
18 cruel world out there. People make good bargains and  
19 people make bad bargains and to some extent, what that  
20 represents is a transfer of spending power from one  
21 individual to another individual. And these are called  
22 in economic jargon, transfer payments, and the point  
23 being made in the cost benefit guide is that transfer  
24 payments neither increase nor decrease the total value  
25 of consumption opportunities available in the economy.



1 buying it for cottage purposes, the value is diminished  
2 so greatly on the value of that property, all the other  
3 market factors are gone, it is just that here somebody  
4 can buy a place because Joe is losing it because he is  
5 locating and I can pick it up for \$2,000 instead of  
6 what was the cost maybe to build it, of \$50,000.

7                   Does that in any way alter the economic  
8 pie theory that somebody's loss is someone else's gain,  
9 but the true value or the original value before let us  
10 say in a one-industry town, is gone, there is no real  
11 market value left. I mean is that taken into  
12 consideration I guess when doing an analysis?

13                   DR. MULLER: Well, the short answer is  
14 that cost benefit analysts have spent a lot of time and  
15 consumed a lot of ink in trying to clarify the  
16 appropriate way of treating changes in property values.  
17 And it is my understanding of that literature that you  
18 have to be careful in doing so and the summary  
19 statement is you have to be careful in doing so because  
20 the property values represent the capitalized value to  
21 a person of living in a particular place.

22                   Now, we can dig into the reasons behind  
23 that at greater length if you want, but that is the  
24 essence of my answer.

25                   May I just point out a few more warnings

1       in the guide. There is a warning at the top of page 76  
2       against the routine application of shadow prices that  
3       are below market prices of resources on the grounds of  
4       unemployment.

5                    There is a warning against the routine  
6       assessment of the multiplier effect of income and  
7       spending generated by a project on unemployed  
8       resources.

9                    And there is a warning against claiming  
10      benefits for a project that provides above-average job  
11      opportunities as manifested by an above-average wage  
12      rate.

13                  Now, I draw these to the Board's  
14      attention because these are warnings which are given in  
15      an accepted manual of cost benefit guidelines. I  
16      subscribe to the reasoning behind these warnings. In  
17      the guide there are some discussions about when it is  
18      appropriate to deviate from the routine and when it is  
19      not appropriate to deviate from the routine.

20                  But I just wanted to emphasize to the  
21      Board that the position that I have been trying to  
22      recount in the statement that I have been making is not  
23      particularly idiosyncratic to me, it is consistent  
24      with, I think, a reasonable interpretation of other  
25      documents.

1 Now, at this point perhaps I could use  
2 the overhead.

3 MS. SWENARCHUK: Q. You will now also be  
4 using overheads other than available I believe in  
5 Exhibits 1695 B and C, is that correct?

6 DR. MULLER: A. That's correct.

7 Primarily I will be using 1695 C. On one or two  
8 occasions, I will refer to 1695 B.

9 Q. I just have one comment before you  
10 proceed, Dr. Muller. I wonder if you could comment on  
11 one more error in the inventory and that is calculating  
12 costs out of government grants and that is found at  
13 page 74 of the report.

14 A. Certainly, Ms. Swenarchuk. The error  
15 is headed on page 74 calculating costs net of  
16 government grants. And the author of the guide is  
17 making a point which is very similar, I believe, to the  
18 point I make when I considered my agricultural examples  
19 in which the government was subsidizing the purchase of  
20 fertilizer.

21 I was emphasizing at that point that a  
22 social decision should be made on the costs of all the  
23 inputs regardless of who paid for them, just as it  
24 should be based on the benefits of all the outputs  
25 regardless of who gets them. And I believe that this

1 warning against calculating costs net of government  
2 grants is another way of expressing the ideas that I  
3 was trying to communicate then.

4 Q. Thank you.

5 A. Now, Madam Chair and Mr. Martel, I  
6 have tried to organize my presentation roughly along  
7 the lines recommended by the Treasury Board in these  
8 guidelines. The problem at hand is the choice of a  
9 harvest and silvicultural system for a hypothetical  
10 forest management unit.

11 Now, I might emphasize that the purpose  
12 of this demonstration is to give a flavour for the  
13 kinds of things that you might address in a cost  
14 benefit analysis and also to use, for the purposes of  
15 illustration, numbers which are realistic so that they  
16 give us some flavour of the kinds of results we might  
17 see in actually applying this kind of cost benefit  
18 analysis.

19 I emphasize that in my opinion the  
20 results would differ in different forest management  
21 units, that is why I recommend that this kind of  
22 process be done systematically at the forest management  
23 unit level. So in any case, the problem as I see it is  
24 to choose a harvest and silvicultural system for a  
25 hypothetical forest management unit.

1                   Now, to do that you should have an  
2                   objective. And I interpret the policy objective, a  
3                   cost benefit analyst has to look at the policy  
4                   objective which is given and I take as the objective of  
5                   this analysis the choice of a harvest and silvicultural  
6                   system which will better the people of Ontario by  
7                   wisely managing the forest environment.

8                   And for the purposes of cost benefit  
9                   analysis, I am going to interpret this objective as  
10                  requiring that we attempt to maximize the social net  
11                  present value of forest services.

12                  Now, social net present value is my term.  
13                  I view it as having the same content as the requirement  
14                  to maximize net public benefit in the Forest Management  
15                  Act of the United States. The concept can be named  
16                  various names but they are all essentially maximizing  
17                  the net present value of the social benefits that we  
18                  get from the forest services.

19                  Now, Madam Chair and Mr. Martel, in  
20                  choosing, it is recommended in doing a cost benefit  
21                  analysis that you try to be as explicit as possible  
22                  about the alternatives that you consider. And for the  
23                  purpose of this presentation, I have considered four  
24                  basic alternatives and two variants on one of those  
25                  alternatives.

1                   The first alternative which I have  
2                   considered is to use the forest management unit for  
3                   non-timber uses only. I believe it would be fair to  
4                   call that the null alternative.

5                   The second alternative which I have  
6                   called B involves my understanding of Professor  
7                   Benson's recommendations concerning modified cutting  
8                   and enhanced natural regeneration of the forest.

9                   And in particular I have considered, on  
10                  Professor Benson's advice, Alternatives B1 and B2.  
11                  Alternative B1 is a thorough-going 3 coupe modified  
12                  cutting system in which you make three passes to cut  
13                  over the entire forest area.

14                  And as I will mention in a moment, the  
15                  leave period, the interval between each pass turns out  
16                  to be about 10 or 11 years so it is a 3 coupe system  
17                  with a ten-year leave period.

18                  The second modification or second variant  
19                  is a 2 coupe system which I have included again on the  
20                  suggestion of Professor Benson.

21                  The third alternative which I have  
22                  considered is what I interpret to be current practice.  
23                  So it is meant to represent large-area clearcutting  
24                  with intensive artificial regeneration.

25                  And the fourth alternative which I have

1       considered is the alternative of cutting down the area  
2       quickly using large area clearcutting methods and then  
3       just leaving it to regenerate by itself. So  
4       Alternative D is large area clearcutting followed by  
5       natural regeneration.

6               Now, looking at an overhead labeled  
7       constraints, it is the third overhead in package 1696  
8       C, in Exhibit 1696 C, page 3. Cost benefit analysts  
9       are advised according to the Treasury Board, to  
10      consider constraints on alternatives. That is some of  
11      the alternatives you list in the first section of your  
12      report might be thrown out to begin with because they  
13      violate some public policy constraint which is imposed  
14      on the analysis.

15               Now, the main constraint that I have  
16      tried to impose in this analysis is the constraint of  
17      sustained yield, what I have referred to as sustained  
18      yield. Now, I understand that the distinction between  
19      sustained yield and sustainable yield has been a matter  
20      of discussion before this Board.

21               So please allow me to say that for the  
22      purposes of this case study, I have interpreted  
23      sustained yield as meaning that we have to have an even  
24      flow of wood cut throughout the first harvest, an even  
25      flow of wood throughout the first rotation and also

1       that we harvest perpetually, that is after the first  
2       forest has been cut over, a new harvest is to take its  
3       place, a new forest to take its place and it is to be  
4       harvested in its turn.

5                   Now, Alternative D violates the  
6       constraint of sustained yield in the following sense.  
7       It involves a high rate of harvest during the first  
8       rotation followed by a much lower rate of harvest  
9       because I assume for purposes of illustration, that the  
10      period for regeneration is very long under Alternative  
11      D, namely 200 years. So that the volume of wood that  
12      would be taken under Alternative D would be sustained  
13      for 80 years and then it would fall to essentially  
14      nothing until the next regeneration was available.

15                  Now, I am going to turn to page 4 of the  
16      overheads. I am now trying to briefly explain a bit  
17      more about the assumptions which have been made in  
18      preparing this illustrative cost benefit study. I  
19      remind you of course that I have had to simplify, treat  
20      all of the forest management unit as being managed  
21      under one regime whereas in real life there might  
22      easily be different spots within the forest management  
23      unit that were more appropriate for different uses.

24                  For the purposes of analysis, I have  
25      assumed an area of 490,000 hectares, roughly 70

1       kilometres by 70 kilometres. I have assumed that the  
2       area is stocked with mature softwoods, mature conifers.  
3       I have assumed that the stocking is 130 cubic metres  
4       per hectare, by which I mean that I assume you can get  
5       130 cubic metres of usable wood out per hectare of the  
6       forest management unit.

7                   I have assumed that the mill is 100  
8       kilometres away from the forest management unit so we  
9       have to do some -- make some kind of assumption about  
10      how far you have to take this timber to get it to the  
11      mill.

12                  Most of what I have to say is independent  
13       of these particular assumptions because most of what I  
14       have to say starts from the value of the wood on the  
15       stump, but for the purpose of calculating that in my  
16       illustrative cost benefit analysis, I think it is  
17       useful to be explicit about such things as  
18       transportation costs.

19                  Now, I assume that this forest management  
20       unit is being used for several purposes. I assume that  
21       there are what are sometimes called consumptive uses of  
22       the forest environment. It is being used to produce  
23       timber and it is being used by people who want to hunt  
24       or fish, that is consumptive in the sense that it uses  
25       wildlife.

7 I had in mind a picture in which there  
8 were two types of recreational users, the kind that  
9 wants to go in by road and paddle around, camp, and the  
10 kind that gets a lot of value out of the wilderness  
11 experience.

Because some people, including myself,  
feel that the pleasure you get out of canoeing in a  
wilderness area is significantly greater than the  
pleasure you get out of canoeing an area in which there  
are roads and motorboats everywhere.

17 The details of the assumptions are given  
18 on Table 1 of the witness statement and further  
19 information about where I got the numbers is given in  
20 Table 11, I believe it is, of the witness statement.

21 I am now going to turn to page 5 of the  
22 overheads in Exhibit 1696 C and go over very quickly --

23 MS. SWENARCHUK: Q. Excuse me, is that  
24 not 1695 C?

25 MADAM CHAIR: Yes, that's right. It is

1 not 1696, it is 1695.

2 DR. MULLER: I am sorry, I labeled my  
3 copy incorrectly.

4 Exhibit 1695 C. Again, it is incumbent  
5 on a person who is doing a cost benefit analysis to try  
6 to be as explicit as possible about the assumptions  
7 that he or she is making. And in this particular case,  
8 I had to make some base case assumptions, some  
9 assumptions which I was going to work from.

10 I assumed for the purpose of the base  
11 case that the delivered price of wood at a mill was \$25  
12 per cubic metre. I got that by phoning up Canadian  
13 Forest Products in Thunder Bay and asking them how much  
14 they were paying for wood.

15 We have already heard questions from you,  
16 Madam Chair and Mr. Martel, about whether or not that  
17 undervalues wood in an important sense, and I want at  
18 this point to say that most of my discussion, most of  
19 my graphs will be for a price of wood of \$50 per cubic  
20 metre which is double this price. And there is even a  
21 sensitivity analysis of what would happen if the price  
22 of wood was \$75 per cubic metre.

23 So I want to stress that while the values  
24 reported in the witness statement are a first cut base  
25 case for which I make no apology, I am quite prepared

1 to believe that in many cases the value of wood is more  
2 than indicated and I will conduct most of my analysis  
3 as I said for a delivery price of \$50.

4 I assumed also that there was a \$20,000  
5 per kilometre charge for building secondary roads and a  
6 \$8,467 per kilometre cost of building tertiary roads.  
7 I assumed that the primary roads were already in place,  
8 that is I have not counted the cost of building primary  
9 roads in this analysis.

10 I have assumed the logging costs of  
11 \$18.50 per cubic metre. I have assumed a haulage cost  
12 of .07 per cubic metre per kilometre which works out to  
13 be \$7 per cubic metre for the 100 kilometres that we  
14 take the wood from the forest management unit to the  
15 mill.

16 I have assumed on the basis, primarily of  
17 evidence provided by Professor Benson and also evidence  
18 from current forest management agreements, that the  
19 planting cost when you regenerate the forest  
20 artificially is \$500 per hectare and that it costs \$50  
21 per hectare to spray, to tend the forest.

22 I have assumed a real interest rate of  
23 five per cent.

24 I have assumed that all the prices in our  
25 analysis rise at exactly the same rate as the general

1 price level, so that if inflation is at 10 per cent a  
2 year, I am assuming that the price of everything in our  
3 example is going up at 10 per cent a year and I have  
4 cancelled all of those out by applying a real interest  
5 rate of five per cent instead of a market interest rate  
6 of 12 or 13 per cent which is the kind of market  
7 interest rate that we see now.

8 I have also assumed that the delivered  
9 price of wood from this forest management unit does not  
10 change when you increase or decrease the volume of wood  
11 each year being taken away from it. That is, the price  
12 the mill is willing to pay for this wood does not  
13 change if we make a small change in the quantity which  
14 we extract.

15 Most of these assumptions are made for  
16 the purposes of simplicity and establishing a first  
17 cut. They are almost all susceptible of modification  
18 if you wished.

19 Let me briefly go over some of the  
20 special assumptions that I made about each alternative.  
21 I am now looking at page 6 of Exhibit 1695 C and the  
22 special assumptions that we make in the non-timber use  
23 case are first of all that there is no harvest system  
24 because there is no timber use.

25 There is no silvicultural system because

1 there is no artificial regeneration.

2                   There is some recreational use. And I  
3 must say that for purposes of analysis, I had to use  
4 numbers for which do not have a firm basis in the  
5 experience of any particular forest management unit.

6                   I think it is obviously that some forest  
7 management units are going to incorporate territory in  
8 which recreational use is going to be very valuable and  
9 other forest management units are going to incorporate  
10 territory where recreational use is not nearly so  
11 valuable.

12                  I have assumed for the purposes of  
13 illustration that there are currently 1,000  
14 hunting/fishing days in the forest and that each hunter  
15 or fisher is willing to pay \$25 for that hunting or  
16 fishing experience. That is to say even if you charge  
17 that hunter or fisherman an admission fee of \$25 a day,  
18 he or she would continue to hunt or fish.

19                  Similarly, I have assumed that there are  
20 500 visitor days of road access recreation and 1,000  
21 visitor days of wilderness recreational consumption and  
22 you will note here that although it turns out that this  
23 is not important in the final numbers, I have made the  
24 assumption that wilderness use has a much higher value  
25 than road access use to try to capture the idea that is

1 often promoted by recreational groups that wilderness  
2 recreation has a high value that must be preserved.

3 I am now turning to page 7 of the  
4 overheads where I briefly review the assumptions made  
5 in the case of the modified harvest alternatives. For  
6 the purpose of this study, we assumed or I assumed  
7 because I drafted this, a rotation period of 100 years  
8 for the modified harvest system. This is on the advice  
9 of Professor Benson and it is to incorporate the fact  
10 natural regeneration takes a longer time than  
11 artificial regeneration. The regeneration lag is  
12 longer. So I am assuming public policy tells us that  
13 our current harvest has to be spread over 100 years  
14 because it is going to take 100 years to regenerate the  
15 next crop.

16 I am assuming in Alternative B1 that  
17 there are 3 coupes and in alternative 2 that there are  
18 2 coupes, that is three passes through the forest and  
19 two passes through the forest. I am assuming a  
20 ten-year leave period between successive coupes.

21 Now, my reading of the literature that  
22 has been presented to the Board is that one of the  
23 primary concerns in modified cutting techniques is the  
24 possibility that you will have to accelerate the  
25 construction of your roads because when you start to

1 cut, you need effectively three times as much road as  
2 you did with large area clearcutting.

3 So for reasons which I discuss in the  
4 witness statement, I have assumed that if you use a 3  
5 coupe system, your road costs rise by 56 per cent so I  
6 have been trying to make what I consider to be quite a  
7 strong assumption about the increase in road costs.  
8 And I refer to that as a road cost premium and the real  
9 problem here is that you are accelerating the  
0 construction of the roads.

11 For the silvicultural system we are  
12 assuming enhanced natural regeneration, it is enhanced  
13 because of the cutting techniques. And it looks as if  
14 I cannot spell regeneration very well there, I  
15 apologize.

16 I assume that no planting is undertaken,  
17 no spraying is undertaken, that the second rotation  
18 lasts 100 years and that the yield on the second  
19 rotation is the same as the natural yield which is 130  
20 cubic metres per hectare.

21 I tried to make sensible illustrative  
22 assumptions about predicted changes in recreational  
23 pattern. Because we are going to have more roads, I  
24 predict more use of every kind. Basically I have  
25 doubled the hunting and fishing access, doubled the

1 non-consumptive road access and also doubled the number  
2 of people who go in there looking for wilderness  
3 experience.

4                   But the people who were looking for a  
5 wilderness experience do not get nearly as good a  
6 wilderness experience as they used to because there is  
7 roads because I have got the willingness to pay  
8 noticeably less than I had before.

9                   MADAM CHAIR: Dr. Muller?

10                  DR. MULLER: Yes.

11                  MADAM CHAIR: I do not understand quite  
12 why the road premium is more costly for the 3 coupe  
13 system. Would it not just be a matter of road  
14 maintenance for the longer leave period for the third  
15 cut? You are not talking about a larger network of  
16 roads because you are talking about the same area.

17                  DR. MULLER: Yes. Madam Chair, I had  
18 some difficulty with this because I am not a forest  
19 economist whose specialty is in harvesting techniques.

20                  What I did do was I assumed that in the  
21 first year of harvesting, instead of having to build  
22 one kilometre of road, you had to build three because  
23 you have to access three times as much territory in the  
24 first year. And you have to do that for the first ten  
25 years.

1                   And by that time, you have built in the  
2                   first ten years of your process, you have built three  
3                   times as much road as you would have done under  
4                   Alternative C. Because with this big, long ten-year  
5                   leave period, I have got three times as much road being  
6                   produced and I cannot go back to making my second coupe  
7                   until eleven years later.

8                   So by the end of ten years, I have got a  
9                   road network which is three times bigger than I would  
10                  have had. Then I do not have to build -- I assume I do  
11                  not have to build roads for the next 20 years. So by  
12                  the end of 30 years, I have built the same number of  
13                  roads.

14                  The big problem is that I built them in  
15                  the first ten years of the program rather than  
16                  spreading them out evenly. And because of the magic of  
17                  net present value calculations, that is an  
18                  extraordinarily expensive thing to do. The net present  
19                  value or the present value of the cost of a road built  
20                  30 years from now is much less than the present value  
21                  of a road built ten years from now.

22                  So by squeezing all of the building,  
23                  accelerating the building of the roads into the first  
24                  ten years of each 30-year period, I am forced to  
25                  ascribe a much higher present value to the costs and

1 that is why the 3 coupe system looks so expensive.

2 MR. MARTEL: Do you include the  
3 maintenance costs in there or just construction or is  
4 that possible?

5 DR. MULLER: I am sure it is possible. I  
6 didn't feel that I had the expertise to model, sorry  
7 for the jargon, but I didn't feel I had the expertise  
8 to go to great lengths in this illustration to  
9 incorporate maintenance costs so I did not.

10 What I have done is tried to illustrate  
11 the way in which you can incorporate these matters and  
12 make what I feel is quite a conservative assumption,  
13 that is to say I think I have penalized the 3 coupe  
14 system quite handsomely with respect to the others.

15 Are there any other questions that you  
16 would like me to address with respect to this overhead?

17 MADAM CHAIR: No.

18 DR. MULLER: I am now going to move to  
19 the eighth page of Exhibit 1695 C.

20 MR. FREIDIN: I am just wondering just so  
21 we do not have to wait to ask in cross-examination  
22 whether you could just explain, it says management of  
23 \$100,000 at the bottom. You had the same thing I think  
24 at the bottom of the previous exhibit.

25 DR. MULLER: Certainly. My assumption is

1 that it is only fair that --

2 MS. SWENARCHUK: You owe me one for this.

3 MR. FREIDIN: I owe you one, Ms.

4 Swenarchuk.

5 DR. MULLER: It is only fair that if you  
6 are going to count benefits of recreation, you ought to  
7 have some entry for the costs of administering that  
8 recreation. Now, I do not know what those costs are  
9 going to be.

10 I said to myself, suppose you had four  
11 seasonal employees working at -- the equivalent of four  
12 full-time employees working at \$25,000 a year, that  
13 would be \$100,000 to manage the recreational use. I do  
14 not claim anything for this figure except that it is a  
15 place marker. It is a marker to put, to remind you  
16 that something is needed to offset the recreational  
17 benefits. You have to ask yourself about the real  
18 costs of providing those benefits.

19 I do not think that the benefits we are  
20 asking, we are talking about require very much  
21 management and that is why I have got a fairly low  
22 cost.

23 Incidentally, "dollars per A" stands for  
24 dollars per year, dollars per annum.

25 I am sorry, did I discuss the C?

1 MR. MARTEL: No.

2 DR. MULLER: I am going back to page 8 of  
3 the overheads. This is the interpretation of current  
4 practice adopted for purposes of my illustrative case  
5 study. A very important idea here turns out that the  
6 harvest system assumes a large area of clearcut with a  
7 rotation period of 80 years. This is 20 years less  
8 than the 100 years assumed for the modified clearcut.

9 The reason for that is I assume that  
10 public policy is going to tell me that if it takes 80  
11 years to grow a new forest, then you better spread your  
12 cutting of the current forest over 80 years so that you  
13 will finish cutting your first forest when the second  
14 forest is available for cutting.

15 And because it is claimed that current  
16 practice large scale clearcutting and artificial  
17 regeneration will lead to quick establishment and rapid  
18 rotation periods, I have assumed that the artificial --  
19 the large area clearcut system allows us to cut through  
20 the current forest in 80 years rather than 100. That  
21 turns out to be really critical. It is what I call the  
22 allowable cut effect. And it has to do -- and what  
23 happens is that it is this assumption about public  
24 policy which creates an important advantage for the  
25 artificial regeneration system.

1 Now, I assume that we plant at \$500 per  
2 hectare as soon as we cut down. I assume that we  
3 spray, it looks to me as if the overhead I am  
4 projecting is not the same as the overhead which is on  
5 page 8 of the exhibit.

6 And the difference is that page 8 of the  
7 exhibit which is the one that I want to use says spray  
8 in 5 years and 15 years.

9 MR. MARTEL: That is what we have.

10 DR. MULLER: So it is my actual overhead  
11 that I am projecting which did not have the 15 years on  
12 it. So in fact, I did assume a spray in 5 years and a  
13 spray in 15 years.

14 I assumed that it was possible to create  
15 a second forest in 80 years and the second rotation  
16 would be 80 years. And I assumed that because of the  
17 benefits of intensive forest management, the yield on  
18 the managed forest would be 50 per cent higher than the  
19 natural unit. So that is where I get the 195. I am  
20 just taking that as 50 per cent higher than the natural  
21 yield of 130. I am doing this on the advice of  
22 Professor Benson which I sought in forming.

23 Of course, this will be challenged and I  
24 gather that it will be challenged in both directions.  
25 My interest as an economist is showing you in which,

1 how you would incorporate it.

2 As far as recreation is concerned, I  
3 assumed that the same number of days are consumed but  
4 that people do not like recreating, excuse the horrible  
5 word, people do not like recreational activities which  
6 take place in clearcut areas as much as they like  
7 recreational activities that take place in the modified  
8 cut areas and consequently, I have reduced slightly the  
9 willingness to pay for each day of recreation. I have  
10 included management costs as well.

11 I would like to point out that I have not  
12 really addressed the issue of watershed prevention,  
13 watershed protection or biological diversity or any of  
14 these other values about which you have heard  
15 testimony. Again, my theme as I mentioned at the very  
16 beginning of my testimony is that quite often you can  
17 make a decision on the basis of easily measured costs  
18 and benefits without worrying too much about placing an  
19 explicit value on the more difficult, the benefits  
20 which are more difficult to measure.

1 being ruled out for reasons of public policy, that is I  
2 interpret public policy as saying we have to have  
3 sustained yield. But I think it is an interesting  
4 alternative to examine and we will see why in a moment.

5 I assume that we cut the forest down,  
6 that we have no artificial regeneration, that it takes  
7 200 years to grow back the forest to the point where  
8 you can use it again. That was meant to mean -- that  
9 was meant simply to refer to the idea that it takes a  
10 very long time and I assume that the yield of the  
11 subsequent forest is only 80 per cent of the original  
12 standing forest. So it is only 104 metres cubed per  
13 hectare.

14 All of these assumptions are designed to  
15 penalize the future harvest of this method. I assume  
16 that there are recreational values and the recreational  
17 values are the same as they would be for the large area  
18 clearcutting or at least they are on the first cut  
19 because the first harvest under Alternative D is  
20 exactly the same as the first harvest under Alternative  
21 C.

22 Madam Chair and Mr. Martel, are there any  
23 questions you would like to raise at this point about  
24 the assumptions that I have made or shall I go on and  
25 talk about the results which I have obtained?

1                           MADAM CHAIR: Go ahead with the results,  
2                           Dr. Muller.

3                           DR. MULLER: Now, I apologize for the  
4                           quality of this, I know it is actually not so...

5                           I am now looking at an overhead which is  
6                           page 10 of Exhibit 1695 C and I might apologize to the  
7                           Board. I would like to draw your attention to the  
8                           vertical axis which is labeled "Net Present Value,  
9                           Thousands". That is a device, that is a result of the  
10                           computer program that I used and did not have a chance  
11                           to correct. That should read millions of dollars, in  
12                           other words, this is thousands of thousands of dollars.  
13                           It is millions of dollars. So the vertical axis is net  
14                           present value measured in millions of dollars.

15                           DR. MORRISON: Excuse me, Dr. Muller, is  
16                           that the same for the other?

17                           DR. MULLER: That is the same for page 11  
18                           and it is the same for page 12 and page 13 I managed to  
19                           correct.

20                           Now, it is not surprising that in the --  
21                           although it took me by surprise when I did the  
22                           calculation, it shouldn't have been surprising when I  
23                           did the calculation to find that the net present value  
24                           of Alternatives B, B1, B2, C and D were all negative  
25                           under my base case assumptions.

1                   My base case assumptions you will recall  
2                   included a price at the mill of \$25 per cubic metre of  
3                   wood. I had assumed already that it cost \$18.50 to cut  
4                   the wood and I had assumed that it cost \$7 to bring the  
5                   wood to market because the forest management unit was  
6                   100 kilometres away from the mill. And so  
7                   consequently, I could have simply looked at the \$25 of  
8                   value of the wood at the mill and subtracted \$25.50 of  
9                   cost of getting the wood to the mill and it would have  
10                   been obvious that the net present value was negative.

11                   I just want to remind the Board that I  
12                   took my base case from the literature and from this one  
13                   telephone call without deliberately trying to set up a  
14                   situation that was favourable or unfavourable to  
15                   anybody. This is the situation that I took on the  
16                   basis of the literature as I saw it.

17                   Now, already we can see a couple things  
18                   from this. The net present value of the every  
19                   alternative is negative. The net present value of  
20                   Alternative C is dramatically more negative than the  
21                   net present value of Alternative B. And the net  
22                   present value of Alternative D, the one which violates  
23                   our constraint is also significantly less negative than  
24                   Alternative C.

25                   So Alternative C in this case is the

1 worst of all possible worlds and by following it, we  
2 would be getting a negative net present value of about  
3 negative 122-million. Whereas if we followed  
4 Alternative B1, we would be getting a net present value  
5 of the area of 55-million. So the difference of the  
6 order of \$70-million represents lost consumption  
7 opportunities for the present.

8 MS. SWENARCHUK: Q. Dr. Muller, you  
9 indicated that all alternatives have negative net  
10 present value. What about Alternative A?

11 DR. MULLER: A. Alternative A in this  
12 case, does not, I am sorry, all of Alternatives B1, B2,  
13 C and D have negative net present value. Alternative  
14 A has positive net present value, very small, but still  
15 positive. And the reason is that it has recreational  
16 uses and we are not using timber, using it for timber.

17 Now, a moral that I can draw from this is  
18 first of all that the recreational values that I have  
19 assumed are pretty small compared to the timber values.  
20 I have separated out in this overhead the net present  
21 value of the timber and the net present value of the  
22 recreation and you can see that the net present value  
23 of the recreation is tiny compared to the net present  
24 value of the harvest. The main thing I would claim for  
25 this example is that there must be areas in the

1                   province...

2                   MR. FREIDIN: I am sorry, I did not hear  
3                   that.

4                   DR. MULLER: I am sorry, there must be  
5                   areas in the province--

6                   MR. FREIDIN: Thank you.

7                   DR. MULLER: --in which harvesting  
8                   generates a negative net present value. These will be  
9                   areas which are a long distance away from the mills and  
10                   areas in which it costs a great deal to access the  
11                   timber and areas in which -- sorry, a long way away,  
12                   costs a great deal to access and perhaps areas in which  
13                   the yield is low.

14                   But the main item, the main conclusion I  
15                   draw from this is that there must be cases in which it  
16                   would be better to use the land for non-timber uses  
17                   rather than for silvicultural and harvest uses.

18                   MS. SWENARCHUK: Q. Dr. Muller, I  
19                   suggest unless you have other comments on this page  
20                   that we stop there for a lunch break.

21                   DR. MULLER: A. Certainly.

22                   MADAM CHAIR: Dr. Muller, will your  
23                   evidence be finished when you have completed these  
24                   overheads?

25                   DR. MULLER: Yes, it will.

1                   MADAM CHAIR: And Dr. Morrison?

2                   DR. MORRISON: I have something else.

3                   MADAM CHAIR: We should be able to finish  
4                   this in an hour?

5                   DR. MULLER: I would think so, yes. We  
6                   have laid a lot of the groundwork and I want primarily  
7                   to discuss the sensitivity analysis, that is the graphs  
8                   which show the sensitivity to changes in my  
9                   assumptions.

10                  MADAM CHAIR: Okay. Mr. Hanna, you will  
11                  be able to begin this afternoon?

12                  MR. HANNA: Yes, Madam Chair, and I  
13                  expect that having heard the evidence that I will be  
14                  quite brief. I may be able to complete today.

15                  MADAM CHAIR: Thank you very much, Mr.  
16                  Hanna.

17                  MS. SWENARCHUK: I just wanted to add,  
18                  Madam Chair, that I will be very briefly putting to Dr.  
19                  Morrison and Dr. Muller perhaps one question about  
20                  FFT's terms and conditions. That's the only additional  
21                  question I will have after the cost benefit analysis is  
22                  finished and I am telling you that partly so that you  
23                  will have them available too.

24                  MADAM CHAIR: Okay. Thank you.

25                  ---Luncheon recess at 12:00 p.m.

1        ----On resuming at 1:40 p.m.

2                    MADAM CHAIR: Please be seated.

3                    DR. MULLER: Madam Chair, Mr. Martel,  
4                    during lunch break, I was double checking to see why  
5                    those recreation benefits were so small on this slide  
6                    of net present values. And it does turn out that I  
7                    made an error in transcribing the number of hunter days  
8                    in calculating recreational benefits.

9                    We checked against the most recent OMNR  
10                   statistics and it turns out that we had used the actual  
11                   kill rather than the number of hunter days in these  
12                   numbers on page 209 of the witness statement.

13                   We have done a quick estimate of the  
14                   effect of that using the correct provincial averages  
15                   for numbers of hunter days, numbers of deer, numbers of  
16                   bear hunting days, and the net result is that we would  
17                   have expected 14,617 hunter days on a FMU of this size  
18                   based if it received exactly the provincial average  
19                   number of hunter days per hectare.

20                   The result of that is that the  
21                   recreation -- now, I assumed for the purposes of this  
22                   cost benefit analysis 1,000 hunter days or 2,000 hunter  
23                   days depending on the presence of roads. So if you  
24                   wanted it to be at provincial averages, the numbers  
25                   should be about seven times bigger, in the cases of

1       Alternatives B1, B2, C and D and they should be about  
2       14 times bigger in the case of Alternative A.

3                   I want to stress that this reinforces the  
4       case for recreational management rather than timber  
5       management and I am going to be focusing almost  
6       exclusively on timber management, the issues in the  
7       remaining slides, but I do want you to be aware of the  
8       fact that the numbers assumed for hunting days in this  
9       representative case study are below the provincial  
10      average for an area of that size.

11                Madam Chair and Mr. Martel, I now would  
12      like to draw your attention to the overhead which  
13      appears as number 11 on Exhibit 1695 C. This bar graph  
14      represents the same computations as was made in the  
15      base case, as were made in the base case, with the  
16      exception that it is assumed that the price of wood at  
17      the mill is \$50 per cubic metre rather than \$25 per  
18      cubic metre.

19                Now, you will recall that this is twice  
20      the price that was quoted to me by Canadian Pacific  
21      Forest Products by telephone. But it yields a value of  
22      wood which is approximately that for the Canadian  
23      average of all pulp and paper companies. We have, I  
24      believe, entered as an exhibit or have the extract from  
25      the publication entitled Timber Sales and --

1 MS. SWENARCHUK: Q. It is Timber Values  
2 and Stumpage in the 15 per cent export tax?

3 DR. MULLER: A. Yes.

4 Q. That is Exhibit 1697?

5 A. 1697, do you have a copy? Yes,  
6 Exhibit No. 1697 is an extract from a report prepared  
7 for the Industrial Restructuring Commissioner and it is  
8 entitled Timber Values Stumpage and the 15 per cent  
9 export tax, and it is prepared by David Quirin and  
10 William Waters. And David Quirin I know of as a  
11 well-regarded financial analyst, a professor at the  
12 University of Toronto.

13 Appendix 3 of this document was directed  
14 at deriving the value of wood for six major pulp and  
15 paper producers. I will not take you through the  
16 detailed steps followed by Professor Quirin and his  
17 co-author, but I will inform you that they are  
18 fundamentally the same conceptual steps as I would  
19 recommend in calculating the value of wood.

20 And if you turn to the last page of the  
21 package, Schedule III-1D, you will find a schedule  
22 which gives the value of wood calculations for six  
23 major Canadian pulp and paper producers in 1988. And  
24 the bottom line of this schedule, line number 8, is the  
25 net value of wood after stumpage per cubic metre. And

1 the average for six major Canadian pulp and paper  
2 producers is \$19.33.

3 Now, Madam Chair, as I interpret the  
4 methodology used in this report, the \$19.33 is the  
5 private value to the company and to that you should add  
6 the payment made to the Province in the form of  
7 stumpage. Stumpage payments in Ontario for integrated  
8 firms are running around \$7 per cubic metre. So if you  
9 add that to the \$19 per cubic metre you get \$26 per  
10 cubic metre as the net value of the wood including the  
11 stumpage payments that are made to the Province.

12 Madam Chair, if you take \$50 wood at the  
13 mill as in this example and you deduct my \$18.50  
14 assumed logging costs and you deduct the \$7  
15 transportation cost, you come up with \$24.50 as the  
16 value of wood on the stump which would be comparable to  
17 the \$26 which I just derived from this table.

18 I did not have this table available to me  
19 when I prepared my cost benefit analysis. I was  
20 gratified to find that the \$50 wood example corresponds  
21 quite closely to the Canadian average value of wood.

22 I would stress that this is the Canadian  
23 average and consequently includes British Columbia  
24 where the average value of wood is certainly much  
25 higher in many areas than it is in northern Ontario.

1                   I conclude therefore it is a matter of  
2                   some interest to work out what is going on when the net  
3                   price at the mill -- when the price of the wood is at  
4                   \$50.

5                   The overhead which I am looking at now  
6                   which is number 11... again, I should draw to your  
7                   attention the vertical axis is measured in millions of  
8                   dollars. It shows two sets of bars. One set of bars  
9                   is for recreation. Those bars are almost invisible,  
10                  they are very small, and I have just told you that I  
11                  would expect in most real cases recreational values to  
12                  be somewhat higher.

13                  I want to focus primarily on the timber  
14                  values. By the timber values, I mean the net present  
15                  value of the benefits of the harvest as sold to the  
16                  mills, minus the costs, the present values of the costs  
17                  of harvesting, planting, building roads and extracting  
18                  the wood.

19                  In this alternative, I think the most  
20                  significant thing is that the Forests For Tomorrow  
21                  preferred alternative, Alternative B1, has a net  
22                  present value which is almost the same as but slightly  
23                  higher than Alternative C. At values of wood of \$50 at  
24                  the mill in this particular case study, we get a higher  
25                  net present value out of Alternative B1 than we do out

1 of Alternative C which is large-scale clearcutting with  
2 artificial regeneration.

3 If this graph were to fairly represent a  
4 particular forest management unit, then I would  
5 conclude that it was a better choice to maximize -- to  
6 choose the modified clearcut 3 coupe harvest than the  
7 large-area clearcut artificial regeneration scheme on  
8 the basis of timber values alone and I would then not  
9 have to say that there is a big value on recreation or  
10 a big value on ecological sustainability that I have to  
11 pull in to justify the use of a modified clearcut.

12 So what I am trying to say here is that  
13 under some circumstances it seems quite reasonable to  
14 believe that the net present value of a 3 coupe  
15 alternative is greater than the net present value of  
16 the current practice alternative.

17 I also draw your attention to the fact  
18 that Alternative D has a significantly larger net  
19 present value than any of the other three. I am  
20 excluding the null alternative for a moment because it  
21 is not directly connected with timber values.

22 What this says is that the crudely  
23 measured net present value on the basis that we have in  
24 the cost benefit study goes down rather dramatically  
25 from somewhere in the neighbourhood of \$240-million to

1 somewhere in the neighbourhood of \$180-million if you  
2 choose any of the alternatives, B1, B2 or C rather than  
3 Alternative D.

4 Now, you will recall that Alternative D  
5 involved non-sustainable forestry, it involved cutting  
6 down all of the trees right away. So what this is  
7 telling us is that these crudely measured market  
8 signals are driving a rapid cutting down of the forest.

9 Now, if you pictured a private individual  
10 bearing all of these costs and making decisions based  
11 only on these costs, that private individual would  
12 probably choose Alternative D, harvest everything and  
13 not worry about regeneration.

14 We do not for a moment suggest that that  
15 is the best thing to do. What we are suggesting is  
16 that the public value of regenerating the forests is  
17 imposing a constraint on net present value maximization  
18 and the value of that constraint is about \$60-million  
19 in the case of this forest management unit.

20 Now, I believe we can get more insights  
21 into what is going on by looking at page 12, sorry,  
22 yes. I am now looking at page 12 which is an overhead  
23 entitled Timber Values, \$50 Wood. I remind you again  
24 that the vertical axis of this should be measured in  
25 millions of dollars, the net present value in millions

1 of dollars.

2                   And what I have done here is break down  
3 the net present value which is attributable to timber  
4 into several categories. There is the value of the  
5 wood that is harvested in the first harvest. There is  
6 the value of the wood that is harvested in the second  
7 harvest, second and all subsequent harvests. There is  
8 the value of the secondary roads.

9                   I might mention that for the purposes of  
10 this particular graph, the cost of the tertiary roads  
11 has been deducted from the first harvest, from the  
12 value of the first harvest. I guess that probably did  
13 not come through clearly.

14                   The value of the first harvest includes a  
15 deduction for the cost of the tertiary roads and in  
16 addition there is an item here for the secondary roads.  
17 And there is a little item here for protection  
18 expenditures.

19                   Now, what we see is that the present  
20 value of the first harvest is significantly less for  
21 the modified harvest natural regeneration than the  
22 value of Alternative C. Alternative C has a present  
23 value of about \$250-million for the first harvest  
24 compared with just under \$200-million for the modified  
25 cutting alternatives.

7 Notice that Alternative C and Alternative  
8 D have the same present value for the first harvests,  
9 that is because the harvest schedule is essentially the  
10 same in both cases.

11 So what is going on here, Madam Chair and  
12 Mr. Martel, is that the reason that the net present  
13 value of Alternatives B1, B2 and C are comparable when  
14 you look at the overall net present value, is that the  
15 higher net present value of the harvests under  
16 Alternative C for the first harvest is offset by  
17 negative present values for subsequent harvests.

1 alternatives.

2 I should remind you that in the  
3 following, in this graph and in the following, I have  
4 dropped the null Alternative A in order to focus more  
5 clearly on the three harvesting alternatives.

6 MR. FREIDIN: Could you just put that one  
7 up again, Dr. Muller?

8 DR. MULLER: Certainly.

9 DR. MORRISON: There is a difference  
10 between what you have up there and what we have in the  
11 copy.

12 MR. FREIDIN: I was wondering whether  
13 that is of any significance.

14 DR. MULLER: Let me just double check.  
15 It is page 13, is it not?

16 DR. MORRISON: That's right.

17 DR. MULLER: Oh, yes, thank you for  
18 drawing that to my attention. The vertical scale on  
19 page 13 is incorrect, and I believe in package 1696 C  
20 we have the corrected one, don't we? In 1695 C.

21 MR. FREIDIN: The vertical bars are also  
22 different in terms of their hash delineation.

23 DR. MULLER: Okay, now, the page 8 of the  
24 1695 B has a copy of the one that is currently being  
25 projected. Page 8 of 1695 B has a copy of the overhead

1 that is currently being projected.

2 MR. FREIDIN: So we wanted 16 --

3 DR. MULLER: Excuse me.

4 MS. SWENARCHUK: Q. Dr. Muller, we can  
5 run copies at the break of the correct page.

6 DR. MULLER: A. Well, it is even worse  
7 than that because when I was Xeroxing these and  
8 preparing the overheads, I Xeroxed the wrong one.

9 Q. Right.

10 A. And let me just say that on the one  
11 that is currently being projected, these net present  
12 value bars have all been shifted over one column. So  
13 that there is no net present value bar for Alternative  
14 B1, there is a net present bar for an alternative over  
15 here which is not existing. So what has happened is  
16 that is a picture of the state of my mind at eleven  
17 o'clock in the evening, one of a few nights ago.

18 And I suggest therefore that we direct  
19 our attention to the one in your original package which  
20 is page 13.

21 MADAM CHAIR: Which exhibit?

22 DR. MULLER: This is page 13 of package  
23 1695 C.

24 MS. SWENARCHUK: Q. Pardon me a moment,  
25 Dr. Muller.

1 DR. MULLER: A. That is what I would  
2 like to do. I am sorry, I must apologize to the  
3 parties. What we have are two incorrect graphs and  
4 when I tried to repair graph 13 on page 13 I did not  
5 repair it properly. The message I get from it will be  
6 basically the same, but I would like to have the  
7 opportunity of showing you the correct picture. The  
8 message I am going to draw from it is that road costs  
9 are not the dominating force in this in determining the  
10 net present value of the first harvest.

11 Now, Madam Chair and Mr. Martel, I would  
12 like to draw your attention to number 14, the graph on  
13 page 14 of the collection, Exhibit 1695 C. It is  
14 entitled Benefit of Subsequent Harvests and what I am  
15 trying to do with this graph is give you a feeling for  
16 what is going on with regeneration expenditures in this  
17 model.

18 The vertical scale on this diagram is  
19 different. It is the net present value in terms of  
20 dollars per hectare evaluated at the point when you  
21 have just cut down the forests and you are about ready  
22 to regenerate a new forest.

23 What is going on here, and it is also the  
24 net present value of one further rotation. What is  
25 going on here is that Alternative B1 has a very small

1 positive net present value of the expected stumppage.

2 But it costs almost nothing to produce that stumppage.

3 And so the net present value of the subsequent harvests

4 is positive. The same thing can be said for

5 Alternative B2.

6 For Alternative C, we have a vertical  
7 diagonally slashed bar which shows a positive value of  
8 stumppage of the order of \$100 per hectare, but it is  
9 greatly offset by a huge and negative net present value  
10 of silvicultural expenses.

11 So the point is that intensive forest  
12 management in this example yields to some increase in  
13 the value of the stumppage but it costs so much in terms  
14 of present values that the net value, net present value  
15 is strongly negative.

16 Madam Chair and Mr. Martel, this is not  
17 an unusual result. I am presenting it in this fashion  
18 to try to dramatize it. But it is true that quite  
19 often people come up with negative net present values  
20 for silvicultural expenditures even when they include  
21 values of wood which are significantly higher than the  
22 values of wood that we have adopted.

23 Now, the conclusion so far for \$50 wood,  
24 I would say, is that the net present -- that if you  
25 impose the constraint that we have sustained yield,

1 that is if we rule out Alternative D, then the modified  
2 cutting, the modified cutting option on this timber  
3 management unit can be justified in terms of timber  
4 values alone.

5                   And I am not claiming that that will be  
6 the case on all timber management units. I am simply  
7 claiming that an evaluation, a case by case evaluation  
8 of forest management units would almost certainly find  
9 that my numbers are at all representative, you would  
10 almost certainly find some cases in which the net  
11 present value was higher if you follow the modified  
12 cutting techniques.

13                  Now, the remainder of my evidence is  
14 directed at asking the question and answering the  
15 question of whether the result that I have just shown  
16 you for \$50 wood is an obscure result that just happens  
17 to be the case, or whether it is a conclusion which is  
18 likely to hold more generally. And to do that I have  
19 tried what is known as sensitivity analysis, that is I  
20 have tried to calculate what the results would be if we  
21 changed some of the critical assumptions that have been  
22 made in this analysis.

23                  Now, as you will recall, I assumed to  
24 begin with a 5 per cent interest rate and I am now  
25 looking at overhead number 15 which is entitled

1 Interest Sensitivity with ACE. ACE stands for  
2 allowable cut effect. And you may recall that I laid  
3 some stress on the fact that I assume public policy was  
4 dictating a rotation of 100 years for the first harvest  
5 on the modified cut and 80 years for the more intensive  
6 management.

7 Now, I would like to draw your -- what I  
8 have on this diagram, the \$50 wood base case is in the  
9 centre, 5 per cent interest rate with a vertical bar  
10 for the 3 coupe harvests slightly above the vertical  
11 bar for the current practice Alternative C.

12 In between the two is a slightly higher  
13 vertical bar showing the two 2 coupe harvest has an  
14 even higher net present value. And on the right is a  
15 vertical bar indicating that Alternative D has an even  
16 higher net present value.

17 Now, I would like to point out that I  
18 have changed the vertical access here to annualized  
19 benefits and roughly speaking, the annualized benefit  
20 is -- not even roughly speaking, it is the net present  
21 value of the option multiplied by the interest rate.

22 MADAM CHAIR: Excuse me, Dr. Muller, your  
23 sensitivity analysis, will that give us more insights  
24 into the situation with respect to forest management or  
25 is it simply to support your argument that the analyses

1 can be relied upon?

2 DR. MULLER: I believe it will give you  
3 insight into forest management.

4 MADAM CHAIR: All right, go ahead.

5 Excuse me, are any parties going to be  
6 questioning Dr. Muller on his sensitivity analysis?

7 MR. COSMAN: We may be after we hear him.

8 MADAM CHAIR: All right. Go ahead, Dr.  
9 Muller.

10 DR. MULLER: I will try to draw out what  
11 I think are important forest management results. I  
12 just wanted to say this, the height of these bars then  
13 represents a benefit measured in terms of dollars per  
14 year that is flowing from this forest management unit.

15 Now, if you look at a one per cent  
16 interest rate, you will notice that the bar for  
17 Alternative C is much higher than the bars for  
18 Alternative B and the Alternative D. What that says is  
19 that intensive management of the kind that I assert is  
20 current practice looks attractive when interest rates  
21 are extremely low.

22 And fundamentally that means if you can  
23 borrow the money to do the intensive planting  
24 silviculture and you virtually do not have to pay any  
25 interest for it, why then the intensive silviculture

1 looks like a good deal. This is why I am saying it is  
2 insights about the forest management.

3                   But if you have a much higher interest  
4 rate, the gap is not so great. At a higher interest  
5 rate of 9 per cent, the 3 coupe is slightly less than  
6 the 2 coupe system, sorry, the 3 coupe system is  
7 slightly less in annualized value than the current  
8 practice and the 2 coupe is slightly greater than both  
9 of them.

10                  So what that shows is that the interest  
11 rate affects the ranking of these projects, but at  
12 reasonably high -- and at reasonable interest rates,  
13 the modified cut is completely competitive with the  
14 large area clearcut.

15                  Now, I want to draw your attention to the  
16 next overhead which is page 16 and the difference  
17 between page 16 and page 15 is that I have insisted on  
18 page 16, the one you are looking at now, I have  
19 insisted that the first rotation be undertaken in 100  
20 years in all cases.

21                  In other words, I have taken away the  
22 allowable cut effect, I have assumed that we are going  
23 to cut down the forest at the same rate, the current  
24 forest at the same rate in all management alternatives.  
25 Now, the large area clearcut method remains slightly

1 preferred but not nearly as dramatically preferred at  
2 an interest rate of 1 per cent.

3 At an interest rate of 5 per cent and an  
4 interest rate of 9 per cent, the modified clearcut  
5 methods are noticeably -- sorry, the modified cutting  
6 natural regeneration methods are noticeably preferred  
7 to the large area clearcut. And that is because the  
8 main advantage of the large area clearcut method, the  
9 main advantage on a financialal analysis is that you  
10 accelerate the first harvest, you are being permitted  
11 to cut it down in 80 years rather than 100 years.

12 When you restrict -- when these  
13 management alternatives compete in terms of an equal  
14 number of years for the first harvest, the results are  
15 more favourable towards the modified cutting  
16 techniques. I remind you that these slides are for  
17 timber values only, they do not refer to recreational  
18 values.

19 Now, Madam Chair and Mr. Martel, I want  
20 to turn to the slide, the overhead which is number 17  
21 in your package and this shows differences in  
22 annualized benefits at different values of the wood at  
23 the mill. Now, what we have going on here is a  
24 demonstration that the higher the price at the mill,  
25 the more competitive is intensive management.

1 So in my base case, modified cutting,  
2 Alternative B was slightly preferred to Alternative C.  
3 At a price of \$75, Alternative C has a somewhat greater  
4 net present value than the modified cutting ones. At a  
5 price of \$25 they are all negative but the intensive  
6 method is noticeably less preferred than the other two.

12 I now want to turn to number 18, price  
13 sensitivity with no allowable cut effect. Now, very  
14 briefly, the message I want to derive from this  
15 overhead is that once again, the advantage of a high  
16 price for the wood seems to be closely associated with  
17 the advantage of having an accelerated harvest.

The one last pair of pictures that I would like to show you are 19. 19 is natural yield sensitivity with an allowable cut effect. What I am trying to get at here is what does the variation in the natural fertility of the forest do for us in terms of choosing management techniques.

And this particular graph indicates that on the basis of timber values alone, when the fundamental natural yield is 75 cubic metres per hectare and when it is 125 cubic metres per hectare, the modified cutting techniques dominate the large area clearcut and that is particularly true with the low natural yield at 75, but it is not true at the high natural yield of 175. At a high natural yield of 175, the large area clearcut marginally exceeds the net present value of the modified cuts.

I should mention to you that in developing this example, I have maintained my assumption that intensive forestry increases the natural yield by 50 per cent and that Alternative D reduces the natural yield by 20 per cent. So that what is going on here is I have the same percentage gap between the alternatives but larger gaps in terms of cubic metre per hectare.

So the message that this gives us is that

1 intensive management is best suited to sites of very  
2 high natural productivity on a net present value  
3 criteria. And that there are many -- presumably there  
4 are many sites where the natural yield is relatively  
5 low where modified cutting techniques are important,  
6 are clearly preferred on this basis.

7 Now, finally, I would like to turn to  
8 number 20. I am sorry, the legend which says 1, 2, 3  
9 and 4 on this overhead, of course number 1 is  
10 Alternative B1, number 2 is Alternative B2, number 3 is  
11 Alternative C and number 4 is Alternative D.

12 In this picture I have assumed different  
13 values for the natural yield in the forest, but I have  
14 insisted that the cut be undertaken in the 100 years in  
15 all management alternatives. So I have eliminated the  
16 annual cut -- the allowable cut effect, and the  
17 important point is that even at 175 cubic -- even when  
18 the natural yield is 175 metres cubed per hectare and  
19 the artificial regenerating yield is 50 per cent higher  
20 than that, it is still not preferred to the modified  
21 cut, modified cut natural regeneration.

22 So what is going on in all of these  
23 pictures is the message that if there is a public  
24 policy decision to let us cut down the current harvest,  
25 current forest faster because of the assumed ability of

1 intensive management to produce an 80-year rotation, it  
2 is that acceleration of the current harvest that is  
3 yielding the apparent advantages of large area  
4 clearcutting when indeed large area clearcutting has no  
5 advantage at all.

6 Now, Madam Chair and Mr. Martel, I would  
7 like to conclude my evidence, at least my presentation,  
8 with two summaries and these summaries appear in  
9 package 1695 B at the end. The one I am looking at now  
10 is page 9 of package 1695 B. It is headed Conclusions:  
11 Sensitivity Tests, and my main conclusion is that for  
12 this particular case study and looking at timber values  
13 only, the modified clearcut Alternative B has a higher  
14 net present value than Alternative C, that is it  
15 dominates Alternative C except when interest rates are  
16 very, very low or actually when they are very, very  
17 high.

18 Alternative C is also preferred on these  
19 calculations if the mill price is very, very high, that  
20 is if the value of the wood is very high and if the  
21 yield from intensive management is very, very high.  
22 That is one conclusion.

23 The second conclusion is that the main  
24 advantage of the current practice technique is a  
25 shorter rotation period for the first harvest.

1                   Now, Madam Chair, I want to draw some  
2 conclusions from this case study and I want to be clear  
3 about the kind of conclusions I am drawing. The case  
4 study was hypothetical in the sense it does not belong  
5 to a precise forest management unit. The numbers I  
6 have used are reasonable in the sense that they are  
7 drawn from the literature.

8                   The conclusions that I reach are first of  
9 all that it is quite practical to set up a simple kind  
10 of cost benefit analysis. You could, without excessive  
11 difficulty, set up this kind of thing on a computerized  
12 work sheet. It took me, starting from scratch, it took  
13 me about three or four days to get the system up, the  
14 work sheets up, to prepare this cost benefit analysis.

15                  Obviously you would want to invest  
16 considerably more time in making very sure that your  
17 information was correct and that all the calculations  
18 were correct within the cost benefit analysis.

19                  The second conclusion I draw from  
20 analyzing the figures on the assumptions -- well, no,  
21 this no longer requires assumption.

22                  The critical factors appear to be that  
23 the choice between intensive management and extensive  
24 management strategies clearly depends on the value of  
25 the wood. When the value of the wood is very high,

1 intensive works better. It depends on the rate of  
2 interest that you apply, and it depends on the rotation  
3 periods which you allow, particularly the rate at which  
4 you allow people to cut down first forests.

5 The third conclusion I reach is that the  
6 preferred use of an area of forest may easily exclude  
7 timber if we are dealing with low mill prices or  
8 conversely high costs of getting the wood to market,  
9 high logging access and transportation costs. And  
10 especially if recreational benefits are higher for a  
11 virgin forest than they are for a cutover forest.

12 Now, Madam Chair and Mr. Martel, I would  
13 like to draw your attention to the very last overhead  
14 in package 1695 B which I am projecting now and which  
15 is entitled General Conclusions.

16 These conclusions are the conclusions I  
17 personally draw on the basis of the witness statement  
18 that Dr. Morrison and I have prepared. I would like to  
19 leave you with a number of basic messages.

20 One is that central to economically wise  
21 management of the forest resource is attention to the  
22 concept of net present values.

23 Secondly, to the best of our ability to  
24 interpret current practices, these practices as  
25 described in the environmental assessment document and

1 elsewhere do not seem directed at maximizing net  
2 present value of the social benefit of the forest.

3 The third will probably draw fire. I  
4 have phrased it as timber management does not  
5 contribute greatly to provincial goals. Now, I am  
6 thinking here particularly of the evidence that Dr.  
7 Morrison produced which indicates that Provincial  
8 government expenditures on forest management greatly  
9 exceed Provincial government revenues from forest  
10 management.

11 And consequently at the time of real  
12 constraint in government budgets, the financing of  
13 silviculture represents a subsidy to industry which is  
14 being taken away from our ability to devote  
15 expenditures to other important social goals.

16 Another theme with respect to the purpose  
17 of these hearings was that in environmental assessment,  
18 you ought to have some reasonable economic analysis and  
19 for the reasons that we have elaborated upon, we see  
20 some major problems with the economic analysis. I am  
21 sorry, this slide says poor and faulty analysis in the  
22 class environmental assessment. I want it very clear  
23 on the record that we are referring to poor and faulty  
24 economic analysis, not any other kind of analysis.

25 We believe on the basis of our

1 investigation and what we have learned from preparing  
2 this report that requiring simple cost benefit analyses  
3 at the forest management unit level would improve the  
4 efficiency of forest management and I believe would  
5 lead to decisions which better preserved environmental  
6 values in many cases.

7 So I believe that it would be reasonable  
8 to require as part of the environmental assessment  
9 process that cost benefit analyses, social cost benefit  
10 analyses be drawn up for each management level, forest  
11 management unit.

12 One of the critical issues is willingness  
13 to pay for non-timber uses. We have established I  
14 think in our witness statement that there are well  
15 developed and generally accepted techniques for trying  
16 to get at willingness to pay for non-timber values.

17 Our recreational advice to you is that  
18 these techniques should be developed at the Provincial  
19 level, that the Ministry of Natural Resources should  
20 devote attention to investigating in a manner which is  
21 consistent with currently developed theory, willingness  
22 to pay for non-timber uses. And that information could  
23 guide future development of forest management.

24 Finally, I think it is quite clear that  
25 our current state of knowledge is weak on what economic

1       value to place on certain ecological services provided  
2       by the forest. And in particular, it is services as a  
3       repository of biological information, its existence as  
4       a wilderness, its continued existence for future  
5       generations.

6                   And I think it's clear that if you do not  
7       constrain the net present value calculations in order  
8       to take account of these ecological services, you are  
9       going to wind up with net present value, net present  
10      worth calculations which indicate cutting down the  
11      forest very rapidly and not putting much effort into  
12      maintaining its ecological stability.

13                  And so I would advise you not to adopt as  
14      your sole criteria the maximization of net present  
15      value as measured by simple and relatively crude  
16      economic indicators because we know that that measured  
17      net present value does not really measure the true  
18      natural level of comfort that we are trying to  
19      maximize.

20                  So it is important in our analyses to  
21      protect certain uses that are not clearly protected  
22      within the general framework.

23                  Madam Chair, Mr. Martel, that concludes  
24      my presentation. If you have any questions, otherwise  
25      I will sit down and let Mrs. Swenarchuk continue.

1                           MADAM CHAIR: Thanks, Dr. Muller.

2                           MS. SWENARCHUK: Yes, I just have one  
3 brief question related to the terms and conditions,  
4 Madam Chair.

5                           Q. Dr. Muller and Dr. Morrison, I will  
6 ask you jointly, you have reviewed Forests For  
7 Tomorrow's terms and conditions, have you not?

8                           DR. MULLER: A. That's correct.

9                           Q. And to do this as quickly as  
10 possible, Madam Chair, I will not refer in any great  
11 detail to the section numbers which I reviewed with the  
12 witnesses again today at noon. I guess I should ask  
13 each of you to reply individually.

14                          You will recall that we reviewed Section  
15 14(1) of the terms and conditions which has to do with  
16 the constraint of including ecological sustainability  
17 of forests in deciding silvicultural prescriptions. We  
18 reviewed term and condition 33(1)(B) which has to do  
19 with planning for road corridors and the steps to be  
20 required in that planning process.

21                          We reviewed Article 52(3)(A)(iv) which  
22 has to do with planning procedures to be carried out in  
23 the case of a major amendment. And we reviewed term  
24 and condition 92, Section 3 which has to do with term  
25 and condition 92 having to do with the proposed changed

1 planning process that Forests For Tomorrow advocates.

2 Section 92(3) refers to the inclusion on planning teams  
3 of individuals with economic skills.

4 Section 92(7) has to do with the guiding  
5 principle for the selection of preferred alternatives,  
6 the overall goal being to provide the greatest  
7 long-term net public benefit in an environmentally  
8 sound manner, the costs and benefits of resource use  
9 and non-market values shall be considered within a  
10 framework of environmental protection.

11 And Article 92(8) defines terms including  
12 net benefit and net public benefit and non-market  
13 values. And are you in agreement with these proposed  
14 terms and conditions, Dr. Muller?

15 A. With the proviso that we interpret  
16 cost benefit analysis and social cost benefit analysis  
17 and not private cost benefit analysis.

18 Q. Yes, the term used in Article 92 is  
19 public benefit.

20 A. That's correct. Then I agree with  
21 the spirit of these terms and conditions.

22 Q. Dr. Morrison?

23 DR. MORRISON: A. I agree also.

24 MS. SWENARCHUK: Thank you. That  
25 concludes our direct evidence, Madam Chair.

1                   MADAM CHAIR: Thank you, Ms. Swenarchuk.

2                   Mr. Hanna, should we take the afternoon break before we  
3                   get started?

4                   MR. HANNA: Whatever is convenient for  
5                   you, Madam Chair. We are ready to go now. If you want  
6                   to break now, that is fine with me.

7                   MADAM CHAIR: This is normally the time  
8                   we take. Be back in 20 minutes.

9                   ---Recess at 2:40 p.m.

10                  ---On resuming at 3:10 p.m.

11                  MADAM CHAIR: Please be seated.

12                  Mr. Hanna?

13                  MR. HANNA: Thank you, Madam Chairman.

14                  CROSS-EXAMINATION BY MR. HANNA:

15                  MR. HANNA: Q. Good afternoon, Dr.  
16                  Muller, Dr. Morrison.

17                  DR. MULLER: A. Good afternoon.

18                  Q. I would like to discuss some of the  
19                  matters that you have just discussed while it is fresh  
20                  in my mind and then I would like to turn to Exhibit  
21                  1695 C, please. And specifically to page 10 of that  
22                  exhibit.

23                  Dr. Muller, you may have misspoke  
24                  yourself here but I just wanted to make sure that I  
25                  understood what you said. You were speaking about this

1       exhibit, you had said that the net present value of  
2       timber was far greater than the value of recreation.  
3       Now, did you mean there it is far greater but it is  
4       negative?

5                   A. That's correct.

6                   Q. Now, I tried to distill in my mind  
7       the message that was contained in 1695 C and I just  
8       want to make sure I understood it. I am going to put  
9       this proposition to you and I want to make sure that it  
10      accurately reflects what you are saying to us. 1695 C  
11      as I understand it is based on a hypothetical example,  
12      correct?

13                  A. That's correct.

14                  Q. And you said that there is  
15      potentially circumstances where modified cutting of the  
16      nature that is proposed by FFT may in fact be  
17      preferable in terms of net present value to  
18      conventional clearcutting and artificial regeneration  
19      or without regeneration?

20                  A. What the case study indicates is that  
21      modified clearcutting with natural regeneration may be  
22      preferred to large area clearcutting with artificial  
23      regeneration even when the decision is made only on  
24      timber values.

25                  Q. Now, would you agree with me that it

1 may be the case that in some forest management units  
2 that there may be circumstances where in some cases  
3 using a modified cut may give you the highest net  
4 present value in terms of simply timber values and in  
5 other areas within the same forest management unit, the  
6 alternate, an alternate approach may be preferred?

7                   A. That's correct.

8                   Q. And is it fair then to say that it  
9 would be responsible analysis not to look solely at  
10 using all modified clearcuts or all conventional  
11 clearcuts in a forest management unit, but that one  
12 should look at a combination, not only just the  
13 extremes but intermediate combinations of those  
14 techniques?

15                   A. I believe in introducing the case  
16 study, I noted that the case study applied to the  
17 entire forest management unit only but that was a  
18 simplification and that I believe that in normal cases  
19 there would be areas of the FMU which might require  
20 separate treatment. So I certainly agree with the  
21 proposition that the appropriate management technique  
22 be different in different areas.

23                   Q. Within an FMU?

24                   A. Within an FMU.

25                   Q. And that in order to obtain the best

1       result from a net social benefit point of view, one  
2       must look at various silvicultural options on various  
3       sites and various combinations of those in order to  
4       arrive at the best mix?

5                   A. Yes, I think that one looks at as  
6       many alternatives as appear sensible to look at and  
7       used in combination or singly, then you have to make a  
8       judgment. In the first instance you should be  
9       calculating the easily measured net present value of  
10      those uses. I remind you that I am not advocating that  
11      the decision be made exclusively on the basis of easily  
12      measured costs.

13                  Q. Yes, I understand that.

14                  Now, in a number of the examples that you  
15      showed in your sensitivity analysis, you showed with  
16      and without ACE, correct?

17                  A. That's correct.

18                  Q. Now, I was not clear on your position  
19      whether you felt ACE should be permitted as a  
20      reasonable basis to estimate or to, number one, decide  
21      upon the harvest level, and number two, to estimate net  
22      present value?

23                  A. I think that if there was no public  
24      policy constraint imposed that continuous harvest is  
25      required, then imposing an allowable cut effect will

1 tend to minimize, or will tend to minimize the net  
2 present value of the forest estate. I think I better  
3 rephrase that.

4 Net present values will be highest if you  
5 make your decisions without considering allowable cut  
6 effects, if you allow, that is net present values will  
7 be highest if you do not restrict current harvesting on  
8 the basis of future plants.

9 Q. Slowly there. It seems to be a  
10 contrast. I just want to make sure we do not get  
11 balled up here.

12 A. Yes, let us try it again.

13 Q. Perhaps we can look specifically at  
14 Exhibit 1695 C and perhaps one of your examples,  
15 perhaps we can look at the interest sensitivity  
16 analysis which is on pages 15 and 16. Now, it looks to  
17 me looking at pages 15 and 16 that with ACE, you end up  
18 with a higher net present value?

19 A. For which?

20 Q. For I think virtually all of the  
21 cases and that is because with ACE, you are allowed to  
22 harvest more timber now and you do not have to defer  
23 that harvest to the future?

24 A. Let me put it this way. On page 15  
25 in which we have an allowable cut effect, we are

1 cutting the forest at different rates. At 100 years  
2 for the -- we are cutting over the entire first forest  
3 in 100 years in Alternative B and in 80 years in  
4 Alternative C.

5 Now, if you are going to allow the first  
6 forest to be cut over in 80 years for Alternative C,  
7 you might reasonably ask why not let it be cut over in  
8 80 years for Alternative B as well.

9 Q. No.

10 A. Well, one might, I am not saying that  
11 you would. If you did so, if you allowed the first,  
12 the Alternative B to occur, to be spread over 80 years  
13 instead of 100 years, you would noticeably increase the  
14 present value of Alternative B.

15 Q. I appreciate that.

16 A. But at the end of the alternative, at  
17 the end of the 80 years, you would not have any wood to  
18 harvest.

19 Q. Yes.

20 A. Now, if public policy says that we  
21 must maintain continuity of harvest and therefore we  
22 are not going to admit the accelerated harvest in the  
23 case of B but we will admit it in the case of C, then I  
24 would agree with that ACE should be considered, that  
25 the allowable cut effect should be considered.

1                   But I think that accepting allowable cut  
2 effects as a sensible restriction in your present value  
3 calculations presumes that you accept the evidence that  
4 the natural regeneration will be successful and that  
5 you in fact can get 80-year future, that you can get a  
6 future forest in 80 year's time and that it will have  
7 the high yield which I have attributed to it.

8                   In other words, if you are going to allow  
9 the allowable cut effect and if you are going to allow  
10 the accelerated harvest because of it, I think you  
11 ought to have high confidence in the predictions that  
12 the second forest will be around when you want it in 80  
13 years.

14                   DR. MORRISON: A. Just let me interject  
15 here. I think you are referring to the artificial  
16 regeneration rather than natural regeneration.

17                   DR. MULLER: A. Yes, the artificial  
18 regeneration.

19                   Q. Yes, I understand that, and I was  
20 under the understanding that ACE only applied when you  
21 had artificial regeneration and I want to just make  
22 sure there is no misunderstanding here in terms of this  
23 discussion.

24                   Is it your understanding that the  
25 allowable cut effect is basically a process whereby you

1 are projecting an increase of yield in the future due  
2 to forest investments and on that basis that is the  
3 reason you are allowed to increase the harvest?

4                   A. In the context of the model which I  
5 have presented to you, allowable cut effect is based  
6 entirely on the presumption that a second growth forest  
7 will be available 80 years under artificial  
8 regeneration and it will not be available until 100  
9 years after the first cut under the natural  
10 regeneration. That is what is driving the results  
11 which I have discussed.

12                  Q. Are you suggesting that there is an  
13 allowable cut effect potentially with natural  
14 regeneration and I will even help you, it is my  
15 understanding there is not, so I just want to make sure  
16 I understand your basis for that.

17                  A. I hope that I am not using allowable  
18 cut effect in a way which is misleading people. The  
19 only meaning I attach to allowable cut effect in this  
20 particular example is associated with the fact that I  
21 have allowed the first forest to be cut down in the  
22 same amount of time that it takes to grow the second  
23 forest. If you grow the second forest in 80 years,  
24 then I allow you to cut down the first forest in 80  
25 years. If you grow the second forest in 100 years,

1 then I allow you to cut down the second forest in 100  
2 years.

3 Q. There is another element to allowable  
4 cut effect in some of the material that I have seen and  
5 that is if you are going to change the yield as a  
6 result of your investment in the forest, that that is  
7 also a part of the allowable cut effect and that can be  
8 factored in in terms of the rate at which you cut the  
9 existing forest. Was that included in your analysis?

10 A. You are correct in saying that that  
11 is included in some of the literature and I want to  
12 make it very clear that I did not include that aspect  
13 of allowable cut effect in my calculations.

14 Q. Now, back to the question. You had  
15 said that you do agree with the use of the allowable  
16 cut effect if you are very confident that you are going  
17 to get the results that you are projecting, is that  
18 fair, that is what you said?

19 A. If you are confident that you are  
20 going to get the results that you are projecting and if  
21 you believe that the public policy requiring no decline  
22 in harvest is appropriate.

23 Q. Fine, accepting those two provisions,  
24 let us put into the situation the fact that there is  
25 undoubtedly some risk associated with producing the

1       projected level of production in terms of both the  
2       harvest rate, in terms of the rotation age and the  
3       yield. In the cost benefit analysis approach that you  
4       have brought forward, is it capable of dealing with  
5       those types of risk?

6                   A. The analysis that I have presented is  
7       the simplest possible analysis in my opinion. It is  
8       possible to extend it to cover a good many kinds of  
9       contingencies at the expense of getting a little bit  
10      more complicated. It is quite possible, for example,  
11      to try to quantify the risk to say well we are going to  
12      achieve high yields with a certain probability and  
13      achieve low yields with a certain probability.  
14      And to calculate what is known as I am sure you know  
15      the expected value or the probable value of that  
16      result, and then say that the objective is to maximize  
17      expected net present value.

18                   Q. Is that standard practice in your  
19      experience in dealing with these types of situations  
20      where there is some uncertainty and risk associated  
21      with these types of investments?

22                   A. I think that is the standard next  
23      step up in conducting cost benefit analysis.

24                   Q. I realize that the example that you  
25      have brought forward is hypothetical. If you were

1 faced with an example of trying to project future  
2 yields and trying to deal with the ACE effect, would  
3 you want to see that expected value of the risk of  
4 potential failure incorporated as part of the analysis?

5 A. If on the advice of foresters I was  
6 informed or I understood that the risk was substantial  
7 and might easily affect or there was a good chance it  
8 would affect my decision, then I would want to include  
9 it in my analysis.

10 Q. Can we turn to Exhibit 1695 B,  
11 please, page 10. And these were your conclusions from  
12 the sensitivity tests.

13 A. I think they disappeared on mine.  
14 Yes.

15 Q. Now, my question was dealing  
16 particularly with the critical factors that you have  
17 raised there in terms of value of wood, rate of  
18 interest and rotation period.

19 MR. FREIDIN: Which page are you looking  
20 at, I am sorry, Madam Chair.

21 MADAM CHAIR: Page 9.

22 MR. FREIDIN: Thank you. Sorry to  
23 interrupt.

24 DR. MULLER: It is the second to the last  
25 page.

1                           MADAM CHAIR: Page 9 of the conclusions  
2                           from the sensitivity analysis and page 10 of the  
3                           overall conclusions.

4                           MR. HANNA: Q. The critical factors you  
5                           have listed there, Dr. Muller, would you agree that  
6                           there may be other factors that are equally important  
7                           if you incorporate non-timber values into the equation,  
8                           for example, the willingness to pay values that you  
9                           have estimated for, for example, hunting and fishing  
10                           activities?

11                          DR. MULLER: A. Well, Mr. Hanna, the  
12                          sensitivity tests were conducted on the basis of timber  
13                          values alone.

14                          Q. I understand.

15                          A. And consequently factors related to  
16                          non-timber values would not directly enter this set of  
17                          conclusions. However, I agree with you that the  
18                          non-timber values may be quite important in some cases  
19                          and consequently I would recommend that they be taken  
20                          into account.

21                          Can I just add that part of my strategy  
22                          in setting up things this way is to say that if we can  
23                          rule out environmentally damaging activities on the  
24                          basis of timber values alone, then we may as well rule  
25                          it out right away, not worry too much about the more

## 1 disputable environmental values.

7 Q. So then it is fair to say that the  
8 conclusions you have raised here are specific to the  
9 case study and are not universal conclusions that would  
10 be applicable in all forest management units in a  
11 practical situation?

19 Q. Now, you had indicated in your  
20 evidence that, and I believe it is in your witness  
21 statement on page 123, that there is no one correct way  
22 to conduct a cost benefit analysis. And as I  
23 understood this, and I want to clarify this and my  
24 understanding of this, you are not suggesting that  
25 there are many alternative approaches to the

1 organization, the organization of the information is  
2 consistent regardless of whether it is a complicated or  
3 simple cost benefit analysis, the difference is the  
4 level of detail, is that the message that you are  
5 trying to leave us with 5.1.3?

6                   A. I think that is fundamentally the  
7 message. That is, I would see the main difference  
8 being the amount of detail and the detail can get  
9 overwhelming fairly quickly. And that is the main  
10 difference.

11                  Q. All right. Now, as a way to try and  
12 come to a reasonable decision as to the appropriate  
13 level of detail, I am going to put a proposition to you  
14 and see if you agree with it. Would you agree that  
15 initially the first step in an analysis, a cost benefit  
16 analysis, would be to take the most simple case that  
17 uses the most easily quantified results and determine  
18 what appears to be the best alternative on that basis.

19                  And if on that basis alone given what you  
20 know about the direction of the other things that are  
21 quantified in the analysis, that preferred alternatives  
22 will likely be the preferred alternatives for those  
23 other uses, that that would be a reasonable basis to  
24 decide upon the appropriate level of analysis at that  
25 point?

1                   A. I think you have put it quite well.  
2 I certainly agree that you should start as simply as  
3 possible and only complicate matters when it seems that  
4 there is some real gain in testing your decision by  
5 introducing the complications.

6                   Can I just state though that one  
7 complication I really would like to always see included  
8 is the stating of costs gross of government subsidies,  
9 that is to say I would not like to see people starting  
10 their cost benefit analyses on the basis of private  
11 costs to the pulp and paper companies, ignoring the  
12 fact that there are substantial subsidies being given  
13 for road construction and for silviculture.

14                  Q. Okay. And then in the circumstance  
15 where there is not a clearly superior alternative,  
16 would you agree that it is reasonable to continue to  
17 add in variables until a clearly superior alternative  
18 has become apparent, as a reasonable way to come to the  
19 appropriate level of analysis?

20                  A. I think you are right. I would like  
21 to qualify a little bit. Suppose we have a situation  
22 in which the measured benefits of modified clearcut,  
23 modified harvest with natural regeneration and large  
24 area of clearcut with artificial regeneration are  
25 comparable, they are within a few per cent of each

1 other.

2 It might easily be the case, it seems to  
3 me, that on the basis of the kinds of evidence that  
4 have been presented at this hearing, you would say that  
5 the unmeasured, unevaluated ecological services of the  
6 forest should dominate and that you should choose the  
7 harvest method that protects them. And I do not think  
8 that you are likely to change that conclusion by adding  
9 bits and pieces of detail to the timber value  
10 calculation.

11 Q. Yes, I was actually coming at it from  
12 the other view and that was that you have indicated and  
13 I think the Board has certainly heard much evidence and  
14 in terms of the fact that the timber side is much  
15 easier to quantify than the non-timber side and the  
16 premise I was putting to you was that if it appears  
17 that the timber values prefer one alternative that may  
18 not be what you expect to be giving you the highest  
19 value in terms of the non-timber benefits, then you  
20 would progressively try to put the non-timber benefits  
21 into the cost benefit analysis. And if after going  
22 through that exercise and all of the non-timber values  
23 that are reasonable to quantify, I say the pendulum has  
24 not swung, then you would basically have gone as far as  
25 is reasonable to go?

1                   A. I think you would have gone as far as  
2   it was reasonable to go in terms of introducing more  
3   detail.

4                   Q. That is my point.

5                   A. It is not clear to me that they would  
6   reverse your decision though because as I say, you  
7   might be in a situation in which you are dealing with  
8   unevaluated benefits which are so obviously important  
9   that it is worth the indicated sacrifice of measuring  
10   net present value.

11                  Q. My question to you was simply a  
12   process question, trying to perhaps give us and give  
13   the Board some light as to how to draw that line as to  
14   when you have gone far enough in the analysis in terms  
15   of the quantification side that further quantification  
16   really is not going to be fruitful.

17                  A. I think what you have said is quite  
18   reasonable.

19                  Q. Now, in terms of the quantification  
20   of non-timber values, I gather that you are of the view  
21   that we should attempt to be as quantitative and  
22   precise as is possible and that we should attempt to  
23   improve that over time?

24                  A. That is fair to say.

25                  Q. Now, given that or perhaps I will ask

1 you this. Is it your view that there has been an  
2 extraordinary amount of effort expended in Ontario to  
3 quantify and estimate non-timber values in  
4 socio-economic terms particularly dealing with forest  
5 activities and values or ecological services?

6 A. I am not sure if I got the question  
7 the right way around. Let me say that I am not aware  
8 of a great deal of effort directed at estimating the  
9 willingness to pay for non-timber values in northern  
10 Ontario.

11 Q. Would that be, in your view, one  
12 reason why it is more difficult to quantify those  
13 values as opposed to the timber side where such  
14 information is more readily available?

15 A. Again, I am not quite sure I  
16 understood your question. I think that we do not have  
17 information on willingness to pay for these values  
18 because the research has not been undertaken to try to  
19 establish it.

20 Q. And so my question was, simply, is  
21 that one of the primary reasons in your view that they  
22 are difficult to quantify at the present time?

23 A. Well, forgive me. I think it seems  
24 to me that your question is asking two different  
25 things. One is why are these benefits difficult to

1 quantify and the other is why do we not have  
2 information right now about what the benefits are.

3 Q. I asked you about the benefit side if  
4 we had information, I was now asking you if one of the  
5 reasons they are difficult to quantify is simply the  
6 matter that we have not attempted to collect that  
7 information?

8 A. Well, I am not sure that this is  
9 helpful. The reason that non-timber benefits are  
10 difficult to quantify is first of all that they are not  
11 sold through markets.

12 And secondly, that when you try to  
13 ascertain them through other methods, you are dealing  
14 with newly developed survey technology and we are faced  
15 with questions about whether or not the answers people  
16 give to surveys really measure what they truly would  
17 pay. And we are faced with the fact that people's  
18 answers probably depend on the way in which the  
19 questions are framed.

20 So those are the reasons why it is  
21 difficult to quantify things. It is my position that  
22 despite these difficulties, it is certainly worthwhile  
23 to attempt to quantify them and the reason that I have  
24 not been able to trot in to the Board here and say,  
25 well, the value of an incremental 40-million hectares

1 of wilderness is \$500,000 is because of this kind of  
2 analysis has not been completed.

3 Q. Is it reasonable in your view to  
4 expect the precision and ease with making those  
5 estimates will improve over time if that type of  
6 information is collected and used?

7 A. I am not sure what you mean by that  
8 type of information.

9 Q. The type of willingness to pay  
10 information that you have referred to needed to  
11 estimate non-timber values, non-marketed values?

12 A. I think that making good decisions  
13 about forest management would be easier if we  
14 systematically attempted to collect willingness to pay  
15 information.

16 Q. An argument that has been brought  
17 forward on occasion with respect to this particular  
18 issue is that because of the high level of uncertainty  
19 that some people suggest is associated with these  
20 values, that you are no better off quantifying than  
21 simply saying it is bigger or smaller, would you agree  
22 with that view, or do you feel that it is better even  
23 with a large margin of error to quantify the result?

24 A. Well, I guess fundamentally the  
25 question is whether our decisions would be changed by

1       acquiring additional information. And quantifying  
2       willingness to pay can be done either directly by the  
3       kinds of survey techniques we seem to be talking about  
4       or indirectly by identifying the costs and easily  
5       measured net present value of achieving the goal and  
6       then asking whether we would be willing to pay them.

7               Suppose that we had scientific evidence  
8       to indicate that a certain practice was going to  
9       destroy all life in the forest that has been cut over  
10      and suppose we had a gut feeling that the circumstances  
11      were such that nobody would ever wish to wipe out all  
12      life in northern Ontario forests, why then it does not  
13      seem to me to be worthwhile trying to quantify that  
14      particular willingness to pay much farther.

15               But with that proviso, it does seem to me  
16      in general appropriate to try to refine our estimates  
17      as much as possible and I think just knowing the order  
18      of magnitude of willingness to pay for certain items is  
19      valuable information.

20               Q. On page 125 of your witness  
21      statement, Section 5.1.4 you make reference to the  
22      informational costs or potential informational costs of  
23      a sophisticated cost benefit analysis and we have heard  
24      evidence from Mr. Hynard in particular about the  
25      difficulties that applying this approach on an

1                   operational level might imply.

2                   And I wanted to ask you, would you agree  
3                   with the proposition that there may be a front end cost  
4                   to implementing cost benefit analysis as a routine part  
5                   of timber management plans in terms of both information  
6                   and administrative changes, but that once that front  
7                   end cost is borne, the overall process will be  
8                   streamlined and much less demanding?

9                   A. I certainly hope so.

10                  Q. Has that been your experience?

11                  A. Since I am not -- I have never been  
12                  in an organization which has implemented cost benefit  
13                  analysis as a routine procedure so my experience is not  
14                  applicable.

15                  Q. Now, in terms of generic information  
16                  that might be collected at a Provincial or regional  
17                  level, is it your experience as an economist that that  
18                  regional type or generic information can be used for  
19                  analysis that, for example, at forest management unit  
20                  level rather than having to conduct a willingness to  
21                  pay survey for each timber management plan in each  
22                  forest management unit?

23                  A. I believe that there will be many  
24                  cases in which generic information will be applicable  
25                  to the forest management unit. And I do not think that

1       it will be appropriate in every case to conduct  
2       willingness to pay surveys routinely for individual  
3       forest management units. It might be when those seem  
4       to be particularly unique natural resource  
5       environmental services that can be provided in that  
6       area.

7                   Q. Now, you made reference in your  
8       testimony when you were speaking with respect to the  
9       Treasury Board guidelines that you were of a view that  
10      the members of the public service were quite committed  
11      and hard working people. My client does not dispute  
12      that.

13                  But at the same time my client has a  
14      concern that the professionals responsible with  
15      undertaking this type of analysis have a minimum level  
16      of competence. Would you agree that there has to be  
17      some level of socio-economic training, some minimum  
18      level of socio-economic training in order to implement  
19      this type of approach?

20                A. I think that everybody involved in  
21      the operational development of cost benefit analysis  
22      should certainly have a minimum degree of training.  
23      And I think that the level of economic training  
24      required will increased the higher up in the hierarchy  
25      you go so that the people responsible at the provincial

1 level for organizing this kind of thing I would hope  
2 would have had -- would have a really good command over  
3 the theoretical basis for cost benefit analysis and be  
4 highly trained.

5 I do not think that the people in the  
6 individual forest management unit would need an  
7 impossibly high level of training. It might be  
8 sufficient to make sure that you know, you are familiar  
9 with the concepts of discounting, you are familiar with  
10 the concepts of market failure, you know on the basis  
11 of a single university course what the goals of cost  
12 benefit analysis are and how it is carried out in some  
13 situations.

14 MADAM CHAIR: Do you see then, Dr.  
15 Muller, if MNR were to undertake some systematic cost  
16 benefit analysis for its management units, that that  
17 would be done by a head office, staff who would  
18 organize it and people at the management units would  
19 essentially be outside of it?

20 DR. MULLER: Well now, I am not an expert  
21 in public administrations so my understanding would be  
22 that you would centrally develop a method of trying to  
23 develop this first cut and then you would ask your unit  
24 people, the people responsible for the forest  
25 management unit to follow this method.

1 And you would use information provided by  
2 them and you would hope that they would understand what  
3 it was that they were trying to achieve, and to do it  
4 intelligently and then somebody with further training  
5 and expertise at the central level would review the  
6 results and try to make sure that they were done  
7 consistently with the underlying theory and look for  
8 ways in which they could be improved.

9 I would not want to say that I am ruling  
10 out the -- I mean, I would think that it would require  
11 the full cooperation of the local people but that it  
12 would also require somebody with some greater  
13 background in cost benefit analysis or public finance  
14 at the central level.

15 MR. HANNA: Q. Dr. Muller, have you read  
16 the OFAH terms and conditions carefully?

17 DR. MULLER: A. No, I have not.

18 Q. Have you ever read them?

22 Q. Dr. Morrison?

23 DR. MORRISON: A. I have briefly just a  
24 few minutes ago read sections of it but I certainly  
25 have not read it in its entirety nor have I studied it.

1                           Q. Dr. Muller, could you turn to page 9  
2 of the OFAH terms and conditions, Exhibit 1637, and I  
3 would like you to look specifically at term and  
4 condition 40.

5                           A. Yes, sir.

6                           Q. Subsubsection IV. And after you have  
7 had a chance to study that, would you please indicate.

8                           Perhaps I am sorry to interrupt your  
9 thinking there, you might notice on the opposite side  
10 of the page you will find rationale associated with the  
11 term and condition which will provide explanation for  
12 the reasons for the specific term and condition. You  
13 should review that also.

14                           MADAM CHAIR: Mr. Hanna, was that page  
15 40?

16                           MR. HANNA: Term and condition 40, page  
17 9, Madam Chair.

18                           MADAM CHAIR: Thank you.

19                           DR. MULLER: Mr. Hanna, would you be a  
20 little bit clearer what is meant by socio-economics in  
21 this term and condition?

22                           MR. HANNA: Q. That was going to be one  
23 of my questions to you, Dr. Muller. It is easy to  
24 define, for example, a forester because I can say one  
25 must be an RPF. Similarly we have used in terms of the

1 biologist categories certified positions that are  
2 available to biologists for each of those categories.  
3 Is there a similar certification-type procedure that  
4 would specify a minimum level of training in terms of  
5 socio-economics to the best of your knowledge?

6 DR. MULLER: A. Well, Mr. Hanna, I have  
7 a couple of problems with the term or the condition  
8 number 40. One of the problems I have is I am not  
9 aware of any recognized university discipline certainly  
10 at my university called socio-economics. There is a  
11 generally recognized discipline of economics.

12 There is a generally recognized  
13 discipline of sociology. There is a discipline of  
14 geography. And it is not clear to me then what the  
15 content of the statement of subsection 4 of the term or  
16 of the condition really means. Perhaps I should leave  
17 it there.

18 Q. Well, you still have not answered my  
19 question, however. My question was, do you know of a  
20 similar type of professional certification that is  
21 available in Ontario, that would establish a minimum  
22 level of qualifications that you feel would be  
23 appropriate in terms of let us just leave economics as  
24 being the sole field we deal with.

25 DR. MORRISON: A. Just if I can

1       interject here. Isn't there an important question  
2       about for what purpose? For what purpose does this  
3       person need these qualifications, of what are they  
4       being expected.

5                   Q. I believe that is referred to in the  
6       rationale but I will just explain that briefly to you.  
7       The purpose at least from my client's point of view is  
8       that they wish some assurance that those members of the  
9       government or the industry that are putting together  
10      timber management plans have a minimum level of  
11      qualification.

12                  We have, for example, at this hearing  
13      heard that fish and wildlife supervisors are registered  
14      foresters, registered professional foresters with one  
15      undergraduate degree in wildlife biology and no  
16      biologists working for them. And it is that type of  
17      concern that this term and condition has attempted to  
18      address.

19                  DR. MULLER: A. Well, the shortest  
20      answer to your question is no, I am not aware of any  
21      professional organization of economists which certifies  
22      economists as having competence in this way.

23                  Q. Okay. Now, my question to you is if  
24      we leave out the prefix "socio" and simply talk about  
25      economics, would that be a reasonable means to define a

1 . level of understanding appropriate to implement this  
2 type of approach at a forest management unit level?

3                   A. Well, that brings me to one of my  
4 other problems with the condition. And it is a matter  
5 of personal judgment I guess rather than my expertise  
6 as an economist. I feel that the condition has a  
7 desirable goal but it smacks of credentialism and there  
8 are a lot -- I believe there is a lot of intelligent  
9 people out there without forestry training who -- let  
10 me put it this way.

11                  There are probably intelligent, competent  
12 people out there who are not professional foresters who  
13 would do a fine job in talking about forest growth and  
14 timber harvest and there are probably people out there  
15 who are not university graduates in economics who would  
16 do a fine job of applying the principles that are  
17 necessary in economic analysis.

18                  I kind of back this up with some ad hoc  
19 economic theorizing, but my basic feeling is that while  
20 it is desirable for people to have demonstrated  
21 competence in a field such as this, it is a bit of a  
22 mistake to say that only people with a specific  
23 certificate are capable of doing a job and nobody else  
24 is. I am worried about that.

25                  Q. Have you an alternate proposal to

1 provide assurance to the public that a minimum level of  
2 competence, whether it's credentialism or otherwise, is  
3 provided in the preparation of timber management plans  
4 and if so, could you indicate to me where it is in the  
5 FFT terms and conditions?

6                   A. Well, Mr. Hanna, I do not believe  
7 either Dr. Morrison nor I addressed the issue of  
8 composition of timber management plans. I have  
9 planning experts for developing timber management plans  
10 and consequently I do not think either of us developed  
11 a position on who should be on them.

12                  Q. What I am trying get at with you, Dr.  
13 Muller; and the reason I am asking you is you are an  
14 economist, you have brought forward economic evidence,  
15 you are suggesting that this is an approach that could  
16 be used in a timber management plan. I am asking what  
17 level of competence and how that should be specified in  
18 the appropriate way in the Board's decision if they so  
19 saw fit?

20                  A. Well, without wanting to get hung up  
21 on this, Mr. Hanna, I think the qualification ought to  
22 be that the person is a hard-working, intelligent  
23 person who has demonstrated ability in a wide range of  
24 assignments, who enjoys the confidence of his superiors  
25 and who has had at least one university course or

1 equivalent exposure to the concepts of cost benefit  
2 analysis.

3 MR. HANNA: Madam Chair, I hope to be no  
4 more than maybe two hours tomorrow morning and I should  
5 be finished.

6 MR. MARTEL: Could I get a clarification  
7 from you?

8 Why does just one individual out of all  
9 of them have to have three years experience?

10 MR. HANNA: Well, actually I think, Mr.  
11 Martel, if you look to be an RPF, I am sure one of them  
12 will correct me, we do not have many in the room today,  
13 it is unusual, but I noticed -- I did say there was  
14 not, but there were not as many, is there is a minimum  
15 residence time associated with getting your RPF.

16 I know there is in terms of both the  
17 wildlife biologists, fishery biologists similar type of  
18 residence time and so it was simply just reflecting  
19 that it is already captured in the other qualification,  
20 Mr. Martel.

21 MS. SWENARCHUK: As of May 10th of this  
22 year, you may qualify as well, Mr. Martel. You will  
23 have three years.

24 MR. MARTEL: Is that right? Thanks but  
25 no thanks.

1                   MADAM CHAIR: We will see you tomorrow  
2                   morning at nine o'clock.

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4        ----Whereupon the hearing was adjourned at 4:00 p.m., to  
5                   reconvene on Thursday, February 7, 1991 at 9:00 a.m.

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25        CK [c. copyright 1985].







